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LYMPHOMA OF THE EYE AND ADNEXA

REPORT OF THIRTEEN CASES

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Lymphoma, otherwise malignant lymphoma or lymphoblastoma, is a generic term applied to malignant neoplastic diseases of the lymphoid and hematopoietic tissues. Ocular changes have been observed in cases of the following types of lymphoma: (1) sclerosing (Hodgkin's disease); (2) endothelial (lympho-endothelioma); (3) lymphoblastic (lymphosarcoma), and (4) lymphocytic (lymphatic leukemia). These invariably fatal diseases are closely related and are characterized by hyperplasia and metaplasia of the lymphoid and blood-forming tissues, with enlargement of the lymph nodes, spleen and liver and changes in the bone marrow.

Characteristically, all types of lymphoma show progressive, painless enlargement of the cervical and other lymph nodes, increase in size of the spleen and liver and, in the later stages, secondary anemia and cachexia. There may be remittent fever, and pressure from enlarged glands may give rise to secondary symptoms, such as edema, pleural effusions, anasarca, dyspnea, dysphagia and so forth. Only in lymphatic leukemia is there a pathognomonic blood picture, the white cells usually being normal in other types. The diagnosis rests on the microscopic examination of tissue removed at biopsy, except in lymphatic leukemia, in which it may be made from studies of the blood.

Pathologic changes in the eye and adnexa, aside from the well known retinal disturbances associated with lymphatic leukemia, are rare in lymphoma. The eye may be involved as a result of lymphomatous infiltration in the orbit, lid or conjunctiva, or the ocular changes may be due to increased intracranial or cervical pressure. A case of bilateral exophthalmos resulting from lymphomatous infiltration in the orbits was reported in 1872 by Arnold and Becker;[1] later published reports

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1. Arnold and Becker: Arch. f. Ophth. **18**:56, 1872.

of similar tumors include those of Gallasch,[2] Silcock,[3] Dunn,[4] Kerschbaumer,[5] Werner,[6] Stock,[7] Wright [8] and Bormacher.[9] Lymphomatous infiltration of the orbits and lids with bilateral exophthalmos and thickening of the lids occurred in cases reported by Leber,[10] Delens,[11] Axenfeld [12] and Glinski.[13] Osterwald [14] and Schiötz [15] published cases of bilateral exophthalmos and choked disk. Unilateral exophthalmos occurred in cases reported by Meller [16] and Rumbaur.[17] Lymphomatous changes in the conjunctiva were seen by Guaita,[18] Greeff,[19] Werner,[20] Hudson,[21] Triebenstein,[22] Siemund,[23] Klövekorn,[24] Salus [25] and Musiał.[26] The lids and lacrimal glands were involved in the case of Hochheim,[27] and the lids alone in the cases of Valude and Morax [28] and Dutoit.[29]

REPORT OF CASES

Sclerosing Type.—Hodgkin's disease occurs most frequently in middle-aged men. It is characterized by progressive, painless enlargement of the cervical and other lymph nodes and, in the advanced stages, by increase in the size of the spleen and liver and sometimes remittent fever, secondary anemia and cachexia. Secondary symptoms may follow pressure from enlarged glands. Ocular changes are extremely rare and were observed in only one of a large number of cases. In this case bilateral exophthalmos was present, and over the insertion of the tendon

2. Gallasch: Jahrb. f. Kinderh. **7**:82, 1873.
3. Silcock, A. Q.: Tr. Ophth. Soc. U. Kingdom **8**:53, 1888.
4. Dunn, J.: Tr. Coll. Physicians Philadelphia **15**:103, 1893.
5. Kerschbaumer, R. P.: Arch. f. Ophth. **41**:99, 1895.
6. Werner, L.: Tr. Ophth. Soc. U. Kingdom **25**:180, 1905.
7. Stock, W.: Klin. Monatsbl. f. Augenh. **44**:328, 1906.
8. Wright, R. E.: Am. J. Ophth. **10**:482, 1927.
9. Bormacher, H.: Klin. Monatsbl. f. Augenh. **87**:822, 1931.
10. Leber: Arch. f. Ophth. **24**:295, 1878.
11. Delens, E.: Arch. d'opht. **6**:154, 1886.
12. Axenfeld, K. T.: Arch. f. Ophth. **37**:102, 1891.
13. Glinski: Virchows Arch. f. path. Anat. **171**:101, 1903.
14. Osterwald: Arch. f. Ophth. **27**:202, 1881.
15. Schiötz, I.: Lancet **2**:240, 1916.
16. Meller, J.: Ztschr. f. Augenh. **15**:538, 1906.
17. Rumbaur, W.: Klin. Monatsbl. f. Augenh. **64**:790, 1920.
18. Guaita, L.: Ber. ü. d. ophth. Kong., Pisa, 1890, p. 99.
19. Greeff, C. R.: Arch. f. Augenh. **24**:60, 1892.
20. Werner, L.: Tr. Ophth. Soc. U. Kingdom **24**:24, 1904.
21. Hudson, A. C.: Roy. Lond. Ophth. Hosp. Rep. **18**:153, 1912.
22. Triebenstein: Klin. Monatsbl. f. Augenh. **64**:825, 1920.
23. Siemund: Klin. Monatsbl. f. Augenh. **85**:753, 1930.
24. Klövekorn, G. H.: Röntgenpraxis **3**:1000, 1931.
25. Salus, R.: Med. Klin. **29**:907, 1933.
26. Musiał, A.: Ztschr. f. Augenh. **81**:63, 1933.
27. Hochheim, W.: Arch. f. Ophth. **51**:348, 1900.
28. Valude and Morax: Ann. d'ocul. **127**:190, 1902.
29. Dutoit, A. A.: Arch. f. Augenh. **48**:156, 1903.

of each lateral rectus muscle was a painless, fleshy, grayish-red conjunctival nodule, which measured approximately 1 cm. in diameter. Evidently there was lymphomatous infiltration of the orbits and bulbar conjunctivae. Permission to remove a conjunctival nodule was refused, but a diagnosis of Hodgkin's disease was made from the study of an enlarged cervical lymph node removed at biopsy.

Endothelial Type.—Lympho-endothelioma is a rare type of lymphoma, and comparatively few cases were observed. It is similar in general symptomatology to Hodgkin's disease, and a differential diagnosis is possible only by microscopic study of biopsy material. Ocular changes were noted in three cases and presumably are more common in this type of lymphoma. Unilateral proptosis occurred in two cases, in one of which it was associated with involvement of the lids on the same side. Other ocular changes were the result of intracranial complications or pressure from enlarged cervical nodes. The diagnosis was made in all cases by microscopic examination of an excised cervical lymph node.

In one case symptoms and signs of tumor of the brain developed, with bilateral choked disk accompanied by rather rapid deterioration in vision. The tumor was believed to be lymphomatous, and roentgen therapy was administered. Improvement in the general symptoms was noted; with subsidence of the papilledema, however, secondary optic atrophy developed, and vision was almost completely lost. After a few months symptoms of increased intracranial pressure reappeared, and bilateral papilledema again developed. The edema again gradually subsided, but before it completely disappeared the patient died. This case was followed closely and is offered as proof that edema does sometimes develop in an atrophic nerve head.

In the second case total unilateral paralysis of the third nerve was followed by primary optic atrophy and, after a few months, by proptosis of the globe and infiltration and thickening of the lids on the same side. The ocular changes, with unilateral deafness and anesthesia of one side of the face, were attributed to a lymphomatous tumor of the middle cerebral fossa with extension forward into the orbit.

In the third case there was infiltration of one orbit with unilateral proptosis and paralysis of the sixth nerve. In addition, miosis and slight ptosis (Horner's syndrome) were noted, evidently the result of pressure by the enlarged cervical glands.

Lymphoblastic Type.—Lymphosarcoma occurs at any age; it closely simulates Hodgkin's disease, but the spleen is not so often enlarged and fever is uncommon. Ocular involvement is comparatively frequent. In each of the four cases with ocular changes there was infiltration of the lids with the formation of large, hard, nodular masses. The diagnosis was made in each case by microscopic study of an excised lymph node or of tissue removed from the lid.

In one case large, hard, nodular masses occurred in the lids of both eyes; the skin was discolored, and there was pseudoptosis. Bilateral papilledema was also present.

In a second case the lids were similarly involved, and there was a large, bluish-red, protruding mass in the lower conjunctival culdesac of each eye.

The lids in the third case were similarly involved, and the lacrimal glands were enlarged.

In the fourth case the lower lid of one eye showed nodular thickening. Later proptosis developed on the same side.

Lymphocytic Type.—Lymphatic leukemia may be either acute or chronic. It may occur at any age and is characterized by an absolute and a relative increase in the number of immature and mature lymphocytes in the circulating blood and by enlargement of the lymph nodes, spleen and liver. It is in this type of lymphoma that retinal changes occur; in a large series of cases a number of these were found, but in only five were the ocular changes unusual. The palpebral conjunctiva and lids were infiltrated and thickened in three cases, and in two exophthalmos occurred. The diagnosis was made from studies of the blood.

Acute Lymphatic Leukemia.—In the one case of this type with ocular changes there was unilateral proptosis with infiltration and thickening of the lids on the same side. Ectropion, as a result of the conjunctival thickening, was also present. At necropsy it was established that the proptosis was due to lymphoid hyperplasia of the lacrimal gland.

Chronic Lymphatic Leukemia.—In one case of this type the lids were infiltrated and thickened, and pseudoptosis was present. Large, translucent conjunctival follicles, measuring from 4 to 5 mm. in diameter, were seen in the upper fornices, and similar, but smaller, follicles were present in the tarsal conjunctiva. In the lower conjunctival culdesac of each eye there was a smooth, glistening, fleshy, protruding mass, fixed to the conjunctiva and covered with petechial hemorrhages; the mass on one side extended backward into the orbit. The plica and caruncle of each eye were infiltrated and enlarged.

In a second case the lids on one side were infiltrated and thickened, and there was a mass, similar to that already described, in the lower culdesac.

In a third case there were large, red nodules in the bulbar conjunctiva of each eye and slight entropion of both lower lids.

Bilateral exophthalmos was present in the fourth case. Both lids of one eye and the lower lid of the other were discolored, infiltrated and thickened. Petechial hemorrhages covered the palpebral conjunctiva. Examination of tissue removed from the lid showed typical lymphoma.

COMMENT AND SUMMARY

Ocular changes, other than the retinitis of lymphatic leukemia, are rare in malignant diseases of the lymphoid and hematopoietic tissues. Observations of a large number of cases revealed only thirteen instances of lymphomatous infiltration in the eye and adnexa. However, the possibility of lymphoma must be considered in cases of massive nodular thickening of the lids (fig. 1), unilateral or bilateral exophthalmos or large nodules in or under the bulbar or palpebral conjunctiva (figs. 2 and 3). More rarely, the ocular symptoms follow lymphomatous infiltration in the cranial cavity or pressure on the sympathetic nerves by enlarged cervical lymph nodes. According to LaGrange [30] and others, the ocular lesions are characteristically bilateral, but this contention was not borne out by observations in this study.

Infiltration and nodular thickening of the lids occurred in nine cases, in five of which the condition was bilateral and in four unilateral. One

Fig. 1.—Infiltration and thickening of the lids in the lymphocytic type of lymphoma.

lid alone was involved in one instance. Evidences of inflammation were absent, and the lids were neither painful nor tender. Pseudoptosis was present in the eight cases in which the upper lid was involved. The infiltration appeared to extend into the lid from the conjunctiva and subconjunctival tissues, which were pale, waxy and thickened and in some cases contained petechial hemorrhages. The lymphomatous nodules were usually large and firm and rubbery on palpation. They apparently extended backward into the orbit in some cases. Occasionally, the skin of the lid was infiltrated and firmly attached to the mass. Dilatation of the superficial veins, violaceous discoloration of the skin as a result of subcutaneous hemorrhages and ectropion also occurred.

Exophthalmos as a result of lymphomatous infiltration in the orbit occurred in six cases; it was unilateral in four instances and bilateral in two. In four cases the proptosis was accompanied by infiltration and thickening of the lids, and in one, by nodules in the bulbar con-

30. LaGrange, F.: Traité des tumeurs de l'oeil, de l'orbite et des annexes, Paris, G. Steinheil, 1904.

junctiva. Paralysis of the sixth nerve was present in one case. Since the orbits and lids are rarely involved simultaneously in other forms of tumor, this finding alone creates suspicion of lymphoma.

Conjunctival lymphoma was observed in five cases. It occurred in three cases as a bulging, discolored mass which protruded from the lower culdesac on eversion of the lid, in two cases as grayish-red, fleshy

Fig. 2.—Drawing showing nodules in the bulbar conjunctiva in the lymphocytic type of lymphoma.

Fig. 3.—Nodule in the lower culdesac in the lymphocytic type of lymphoma.

nodules in the bulbar conjunctiva, in one case as multiple, large, translucent follicles in the culdesac and palpebral conjunctiva, and in another case as infiltration and enlargement of the caruncle and semilunar fold.

Bilateral enlargement of the lacrimal glands appeared in two cases, in one of which there was proptosis.

Other ocular symptoms were the result of lymphomatous infiltration in the cranial cavity; e. g., bilateral choked disk developed in two cases, primary optic atrophy in one and total paralysis of the third nerve in

one. Paralysis of the cervical sympathetic nerve, with miosis and slight ptosis (Horner's syndrome), was seen in only one case, although it might be expected more often.

Diagnosis is made by microscopic examination of an excised lymph node or of tissue removed from the local tumor, except in lymphatic leukemia, in which it may be made by examination of the blood. The tumor masses in the conjunctiva, lids and orbit are made up of closely packed lymphoid cells in a fibrous reticulum. There is some question as to whether the lymphoid hyperplasia arises in preexisting lymphoid tissue or is the result of metastases; probably either condition may occur.

In the differential diagnosis several diseases must be considered. Mikulicz' disease with bilateral enlargement of the lacrimal and salivary glands may closely simulate lymphoma. Usually general adenopathy, secondary anemia and cachexia are absent, and as a rule the disease is not fatal.

Malignant or benign orbital tumor is rarely complicated by infiltration and nodular thickening of the lid or conjunctiva. Differential diagnosis is possible only after microscopic examination of tissue from the tumor.

Solid edema of the lids and syphilitic tarsitis, both exceedingly rare, ordinarily give no trouble in diagnosis.

Episcleritis may simulate a lymphomatous conjunctival nodule, but it is accompanied by signs of inflammation.

The follicles of trachoma are not so large, and they do not have the appearance of lymphoid nodules.

The prognosis of lymphoma is poor; it is a fatal disease.

Treatment is of no avail; however, roentgen therapy may reduce the size of the lesions and afford temporary relief.

BILATERAL RETINAL GLIOMA TREATED BY RADIATION

A CLINICAL AND HISTOLOGIC REPORT

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Within the past few years there has been a change in the conception of the proper treatment of bilateral retinal glioma. As recently as 1929, Foster Moore stated that in a case of bilateral retinal glioma in which the tumor in the second eye was only slightly greater in size than the optic disk, on advice of colleagues at Moorfields, both eyes were enucleated. His comment on this procedure later was that, "in the light of our present experience, we should not again entertain the immediate removal of such eyes, nor consider it the proper procedure." In the report in which this comment was made Moore, Stallard and Milner detail the treatment with radon needles implanted within the tumor in five cases of retinal glioma. These same cases were later reviewed by Stallard in an extensive report concerning the use of radiant energy in ophthalmic disorders. Barkan, in 1934, made use of radon needles applied to the sclera over the position of a gliomatous tumor. He also reviewed previously reported cases. Since then there has been a preliminary description by Zentmayer of the intra-ocular use of radon needles. The pathology of retinal gliomas has been reviewed by Grinker.

In reporting the present case we do not believe that it is necessary to review the literature in regard to retinal gliomas since this has been done recently by several authors. Suffice it to say that present opinion indicates that in the presence of an unaffected eye with useful vision, the affected eye should be enucleated; but in bilateral cases in which one eye retains useful vision, and in which ophthalmoscopic examination indicates that, in all probability, the optic nerve head is not involved, the proper procedure would be enucleation of the first eye with irradiation of the second eye.

REPORT OF A CASE

B. G., a boy aged 21 months, was first seen at the Children's Hospital on Oct. 24, 1932. When he was 3 months of age the mother noticed that his right

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eye diverged. Three months after this she noticed a yellowish reflection from the pupil. At no time was the eye inflamed, and at no time did the child complain of pain.

At the time of the first examination there was a divergence of the right eye of about 25 degrees, and there was a grayish pupillary reflection. The cornea was clear and the anterior chamber of normal depth; the pupil was partly dilated and did not react to direct light or in accommodation and convergence.

In the right eye with oblique illumination, the vitreous chamber was seen to be filled with a yellowish-white nodular mass over which passed tortuous and somewhat dilated vessels. A similar picture was seen with a +20 diopter lens with the ophthalmoscope. There was no reflex to transillumination. The intraocular tension as tested by finger was slightly below normal.

The ophthalmoscopic examination of the left eye showed the media clear, the disk oval and healthy in outline and color, and the vessels normal. In the lower nasal quadrant about the midzone was a soft, fluffy, white area, about 3 disk diameters in size, with irregular margins and with an elevation of about 12 diopters. No other retinal or choroidal changes were noted. The diagnosis made at that time was bilateral retinal glioma.

The family history was entirely negative. The patient had a brother aged 8 years, and a sister aged 3 years. The eyes of both were examined and found to be healthy. The patient was born at full term, and the delivery was normal; the development had progressed normally, and there had been no acute illness.

Treatment and Course.—The right eye was enucleated on November 5. After the globe was removed, the orbit was explored by palpation for any masses, and none were found. Following the operation an acute infection developed, and treatment of the left eye had to be delayed.

By December 22, two new nodules had developed below the disk in the left eye. On that date the child was examined under anesthesia. The following description is taken from notes made by Dr. T. B. Holloway:

"The disk is nearly round and healthy. Beginning just off the margin of the disk at 8 o'clock there is a large round tumor mass with lobulated margins and with a lobulated surface. The growth is of a fluffy whiteness, not pigmented, and the surface is traversed by fine retinal vessels and in places penetrated by vessels. The mass is 4 disk diameters in width and 3 disk diameters in height, and has an elevation of 16 diopters. It has a translucent appearance. Beginning about 1½ disk diameters below the disk is a second tumor mass, slightly larger than the first with an elevation of about 13 diopters. Extending down from the lower border of this second mass are white striae. These tracts are made up of tumor tissue and communicate with another globular tumor mass having a width of about 2 disk diameters."

After consultation with the x-ray department of the Hospital of the University of Pennsylvania a course of roentgen therapy to the left eye was decided on. These treatments were given by the saturation method: One hundred and sixty kilovolts, constant potential, was used with a filter of 0.5 mm. of copper and 2 mm. of aluminum. The distance from the target to the skin was 55 cm. Six treatments were given. The first five treatments were applied through a portal including the temporal half of the left eye and the adjacent temporal region. The last treatment was given through a portal including only the temporal region. The amounts and the periods of treatment were: 800 roentgens (r) from Dec. 23 to 29, 1932; 800 r from Jan. 10 to 19, 1933; 800 r from March 9 to 17, 1,200 r from April 27 to May 13, 1,600 r from August 10 to September 6, and 1,600 r

from November 13 to December 11. This made a total of 6,800 r in the course of one year.

The eye was kept under constant observation, and the changes were noted at various times. On March 3, 1933, the patient was examined under di-vinyl ether anesthesia. At that time there were no lens changes. There had been a regression in the size of the lesions in the lower nasal quadrant, to such an extent that the top measured 6 diopters. This was 10 diopters less than just before treatment was started. There appeared to be a shallow hole in the center of the mass. The two lesions below the disk appeared to be of the same size, but the margins of these lesions toward the disk appeared to have increased in height.

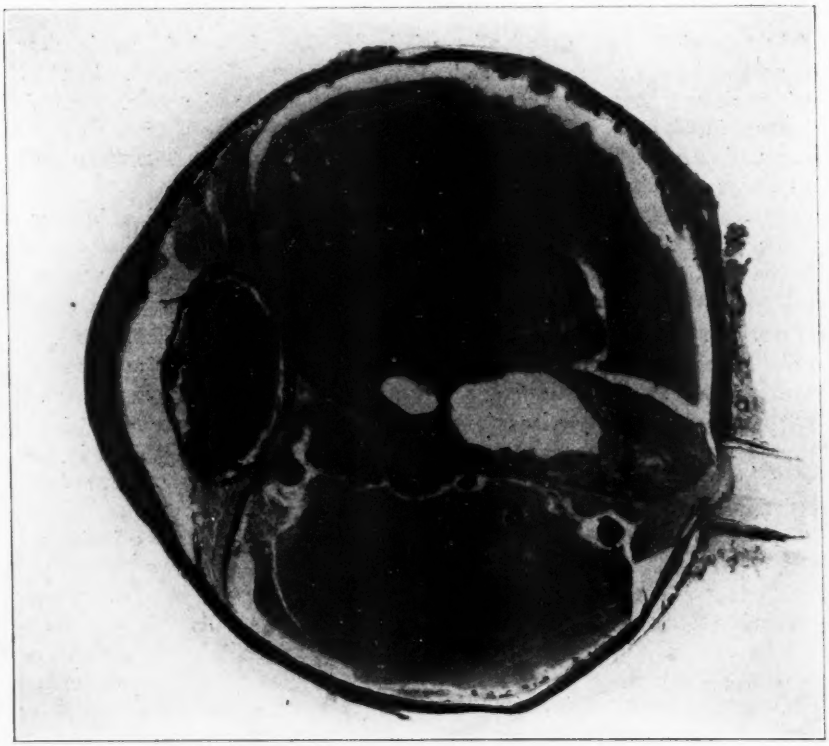

Fig. 1.—Right eye with the central gliomatous mass coming nearly in contact with the posterior surface of the lens.

Examination in April showed no further regression or increase of any of the lesions.

By August, although the lens remained clear, there was a definite increase in all the lesions, and there were several gray, fluffy masses in the vitreous.

By November 13, there was again an increase in the size of all the lesions with an increase in the number of vitreous masses, although the lens was still entirely clear. The child, however, was beginning to have difficulty in getting about because of decreased vision.

By Jan. 6, 1934, the condition had advanced still further so that the vitreous cavity was nearly filled with tumorous masses, the only view of retinal structure

being that above. Enucleation was advised at that time but was not permitted until March 12, when the second eye was removed. Five days later roentgen examination was made of the entire bony structure of the body and disclosed no evidence of metastasis. The child was last seen in July 1934, at which time his weight and development were normal.

Microscopic Examination.—The material was fixed in solution of formaldehyde and stained with hematoxylin and eosin.

A horizontal section of the right eye measured 22 mm. in the anterior-posterior diameter and 21 mm. in the lateral diameter. Four millimeters of optic nerve was removed with the eye. Gross inspection showed a slightly shallow anterior chamber that measured 2 mm. in depth. The whole vitreous cavity was filled with the tumor mass and a granular exudate. The tumor mass occupied the central area,

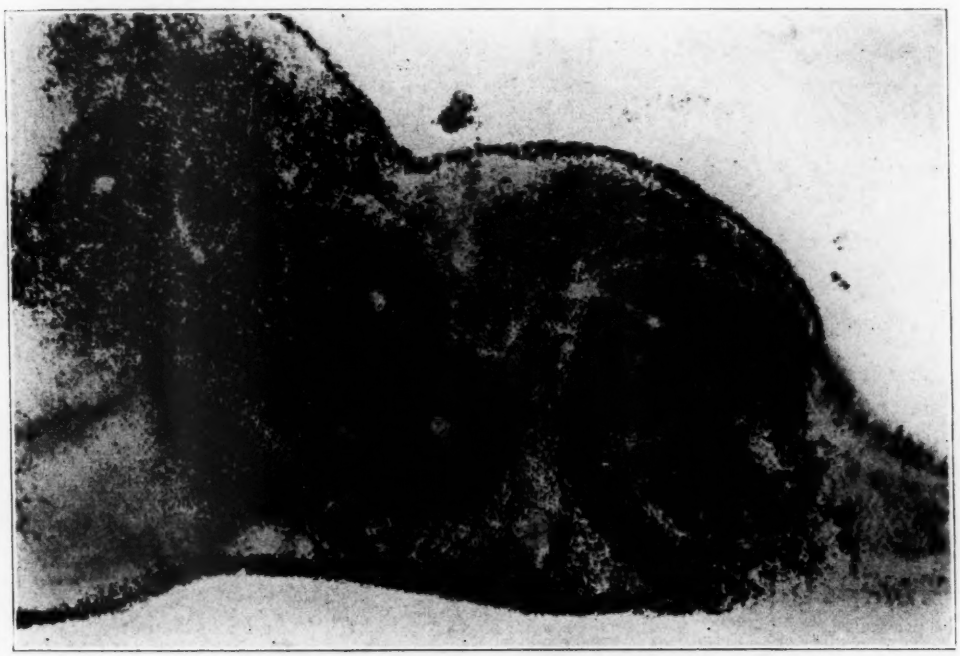

Fig. 2.—Left eye showing pseudorosette formation.

and extended forward to come in contact with the posterior portion of the lens. The exudate occupied the lateral area.

The various corneal layers were intact, and there was no inflammatory exudate. A finely granular exudate filled the anterior chamber. The base of the iris was adherent to the posterior surface of the cornea, entirely blocking the filtration angle. The structures of the iris showed no changes except for a moderate amount of edema just beneath the pigmentary layer. The ciliary body and processes had no infiltrate.

The capsule of the lens was intact and the lens substance did not contain vacuoles. The fibers of the zonule were prominent, and the fibrillar structure of the anterior vitreous was marked.

The tumor mass consisted of irregularly arranged cells rounded, deeply staining nuclei and scant cytoplasm, and at places where the cells were fairly well spread

apart the cytoplasm exhibted one or at times two short processes. At places retinal structure was visible, but it was not possible to determine from which layer the tumor cells proliferated. Pseudorosettes were present in scanty numbers, but no true rosettes were seen. No choroidal or scleral changes were noted, and there was no infiltration of the optic nerve. The diagnosis was retinoblastoma.

The section of the left eye was slightly irregular from shrinkage and embedding, but the measurements, as nearly as could be obtained, were 21.5 mm. in the anterior-posterior diameter and 21 mm. in the horizontal diameter. Eight millimeters of optic nerve was removed with the globe.

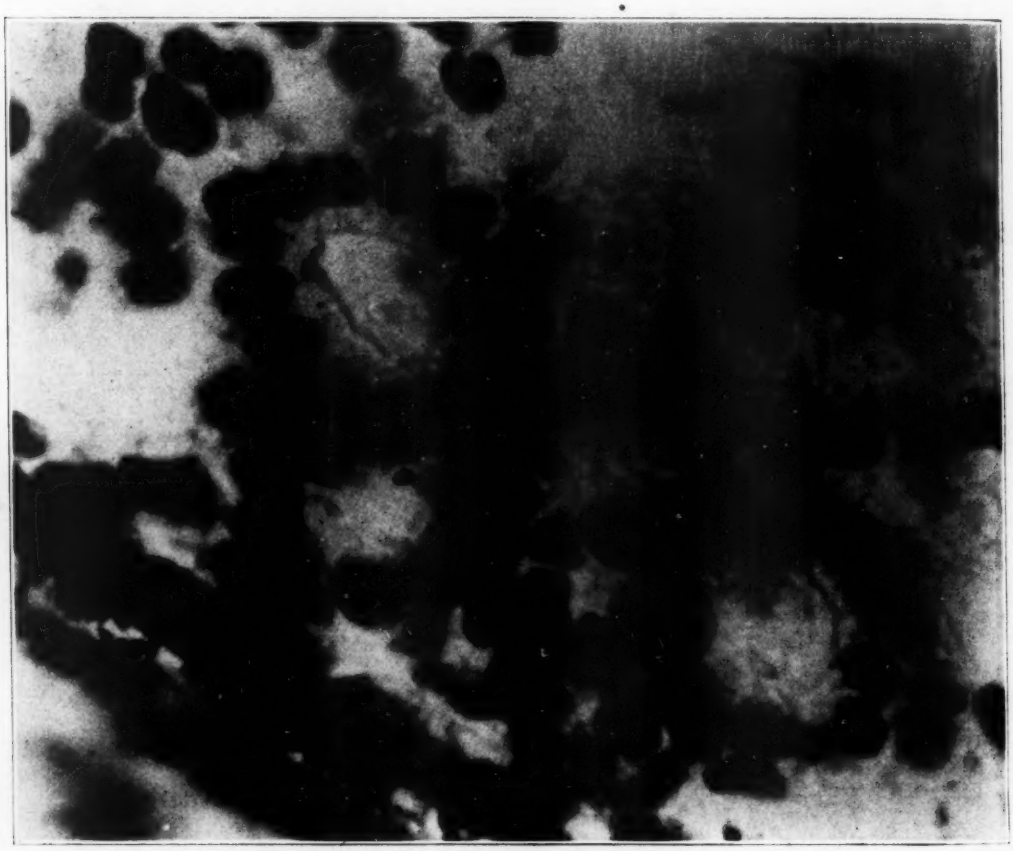

Fig. 3.—Left eye showing rosette formation.

The anterior segment of the eye was similar to that previously described except that there was no exudate in the anterior chamber and the filtration angle was open.

The greater part of the vitreous contained a finely granular exudate. The retina was detached, and throughout its whole extent contained numerous moderately well localized areas of tumor cells. These were in the form chiefly of pseudorosettes, but true rosettes were also present. The nodules of tumor cells had proliferated from the internal nuclear layer of the retina. The cells of the nodules were nearly round and had a scanty cytoplasm. The margins of the nuclei were soft in outline, there was irregular staining of the chromatin, vacuoles were present,

and nucleoli could not be distinguished. These changes were present close to the vessels of the pseudorosettes. At places degenerative changes could be seen in the same area that contained mitotic figures. There was a beginning infiltration of the optic nerve head, but tumor cells did not extend beyond the outer fibers of the lamina cribrosa. There were no choroidal or scleral changes. The diagnosis was retinoblastoma.

COMMENT

Several clinical features of this case were particularly interesting. In spite of the fact that the greater part of the heavy radiation that the left eye received must have passed through the lens, this structure remained entirely clear throughout the whole course and allowed excellent observation of the intra-ocular changes. It would have been impossible or certainly inadvisable to continue the irradiation for such a long period had such observation not been possible. A second feature was that there was relatively little external reaction to the treatments. This consisted in swelling and redness of the lids and chemosis, of short duration, which occurred once and did not recur on subsequent treatment. The most noteworthy feature was the marked reduction in size of the initial lesion after the first two irradiations.

Pathologically the tumors in both eyes fall into the group of retinoblastomas, although in general arrangement an entirely different appearance was present in the two eyes. In the tumor in the first eye removed, the feature leading to this diagnosis was the small, rounded cells with scanty cytoplasm and dark-staining nuclei containing a chromatin network and nucleolus. Where the cells were sufficiently separated, cytoplasmic processes could frequently be seen. A few pseudorosettes were seen. In the tumor in the second eye, cells of similar type were present, but they were more densely packed together and the greater part of the tumor was arranged in the form of pseudorosettes. The true rosettes that were found in the second eye were found chiefly in the outer part of the retina. There is the possibility that the radiation stimulated the production of these rosettes in a type of tumor in which they would not frequently be found.

There is difficulty in determining the amount of change produced in such a gliomatous tumor, which is normally characterized by a moderate amount of degenerative change. Certainly any of the degenerative changes that occurred on the outer rim of the pseudorosettes must be eliminated. In the nonirradiated eye little degenerative change was noted. There was, however, a marked amount of degeneration in cells throughout the pseudorosettes, and in places this was present close to the central vessel, where the nutrition was at its maximum. The degeneration in these areas can be interpreted as histologic evidence of the destructive action of the roentgen rays.

SUMMARY

A case of bilateral retinoblastoma is reported in which the first eye was enucleated, and the second eye, which contained three tumor masses, was irradiated for a period of a year. There was an initial shrinkage followed by a later proliferation of the tumor, and the second eye later required removal. The patient was well when last observed. The degenerative changes in the cells of the second eye may have been due to the radiation.

INCLUSION BODIES IN OPHTHALMIA NEONATORUM

FURTHER NOTE

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In 1930[1] we reported on the occurrence of bodies in the epithelial cells of rabbits treated with various chemical irritants, nicotine and croton oil, which we were unable to differentiate from the inclusion bodies described by Halberstaedter and Prowazek in cases of trachoma and inclusion blenorrhea. It was considered that these were reaction products of the epithelial cells in response to repeated irritation, and it was suggested that the bodies found in cases of trachoma and so-called inclusion blenorrhea might be explained in the same way. Lindner and Lowenstein in personal communications expressed doubt that the bodies we described were true inclusion bodies and considered them probably to be the so-called pseudo-inclusion bodies which had been variously explained as nuclear extrusions, secretory products of the cells and clumps of degenerated bacteria.

Since only a few of the bodies in question, per preparation, were found in this first series of animals, other chemical agents were tried, especially a 2 per cent infusion of senega. This drug, containing a saponin derivative, was suggested by a report of Oguchi and Mikuchi,[2] who used it to produce an increase of mucous secretion in cases in which trachoma was suspected, after which it was easier to find inclusion bodies for diagnostic purposes. In rabbits treated with this drug bodies similar to those previously described were more numerous than in the first series. Certain slight morphologic differences from the bodies seen in inclusion blenorrhea and a somewhat less marked differentiation between the blue inclusion and the pink nucleus in slides prepared according to Giemsa's method were noted, but it was considered that these differences might depend on the animal employed.

The drug was applied to the conjunctiva of two adults, but no such bodies could be demonstrated. Twenty-six infants several days old were treated with the drug. The infants had shown no previous secre-

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1. Gifford, S. R., and Lazar, N. K.: Inclusion Bodies in Artificially Induced Conjunctivitis, Arch. Ophth. **4**:468 (Oct.) 1930.

2. Oguchi and Mikuchi: Klin. Monatsbl. f. Augenh. **85**:709, 1930.

tion, and only one eye of each infant was treated. A moderate reaction was produced which subsided within from twenty-four to forty-eight hours unless the drug was administered again, as it was in several instances. Scrapings made during the period of discharge showed in three instances inclusions which we considered identical with those found in inclusion blenorrhea (fig. 1). They were especially numerous in the scrapings from one baby, four being found in one microscopic field and many others in the preparation, and these were obtained on several subsequent examinations. Five days after the last instillation of the drug the reaction had subsided entirely and no more inclusions were found. The other eye remained normal during this time, and

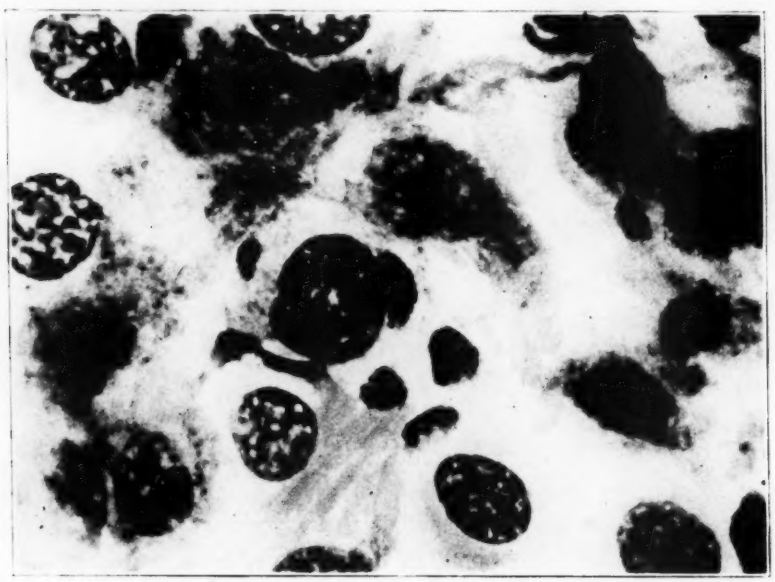

Fig. 1.—Inclusion bodies in the conjunctival scrapings of baby B after the instillation of senega.

subsequently in preparations from the other twenty-three infants no characteristic bodies were found.

These preparations were examined by Dr. E. V. L. Brown and Dr. Peter Kronfeld of the University of Chicago, Dr. Rowland Wilson of the Gizeh Memorial Laboratory, Cairo, and Dr. Arthur Kendall and Dr. Alexander Day of the Department of Bacteriology, Northwestern University. All believed that the bodies could not be differentiated from those seen in cases of trachoma and inclusion blenorrhea.

This work was briefly reported in a discussion of Howard's paper in 1932 [3] and was considered to support our previous opinion that the

3. Gifford, S. R., in discussion on Howard, H. J.: Tr. Am. Acad. Ophth. **37:** 111, 1932.

inclusions were the product of reaction to irritants which was produced most profusely and in characteristic form by the conjunctiva of infants.

In 1934 appeared the work of Thygeson,[4] who was successful in inoculating his own conjunctiva and that of another volunteer with a bacteria-free filtrate containing elementary bodies obtained from patients with inclusion blenorrhea. Typical blenorrhea resulted, and scrapings repeatedly showed typical inclusions and no other pathogenic bacteria. The reaction to the inoculation was positive only when collodion filters were employed with a pore diameter of 0.7 micron, large enough for the passage of the elementary bodies but not for that of bacteria.

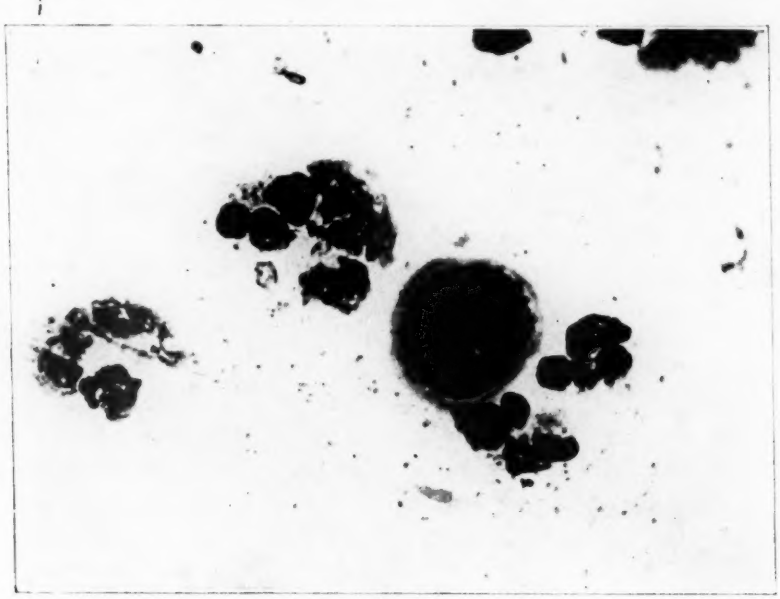

Fig. 2.—Inclusion bodies in the conjunctival scrapings of baby B after the instillation of senega.

Reaction to direct inoculation was also positive in two human volunteers and in monkeys, especially sphinx baboons. Vaginal scrapings of the mothers of several of his patients showed typical inclusions. Positive reaction to inoculation with unfiltered material had been reported by Lindner,[5] while filtrates made in the ordinary way caused a negative reaction. A few reports by others of a positive reaction to an inoculation with filtrates were open to some doubt. Owing to his use of a filtrate free from bacteria but containing demonstrable elementary bodies, Thygeson's experiments for the first time seemed to answer a number of objections to the conclusion that the etiologic agent in inclusion

4. Thygeson: Am. J. Ophth. **17**:1019, 1934.
5. Lindner: Arch. f. Ophth. **78**:345, 1911.

blenorrhea is intimately associated with the so-called inclusion bodies. Personal inspection of Thygeson's conjunctiva four months after his inoculation was especially convincing.

After renewed examination of our material and comparison with preparations from three fresh cases of blenorrhea in which numerous inclusions were evident, we were forced to admit that certain differences between the preparations of animal and those of human material were marked enough to differentiate between them. But between the material from our patients with inclusion blenorrhea and that from three normal babies treated with senega no such difference existed. Material from one baby which had been preserved was sent to Dr. Thygeson, who wrote: "Slide number 1 is still good and contains many typical inclusions as well as free elementary and initial bodies." He believed that this must have been material from a case of inclusion blenorrhea in which only one eye was affected and in which the disease was in the stage of incubation when the drug was instilled. He thought the acute stage must have subsided when the instillations were stopped and that the chronic stage was not observed.

Attempts to repeat our findings had been resumed, with the same technic as before. Twenty-seven infants were treated, but in no case of this new series were inclusions found.

As a result of the experiences herein set forth we are forced to the following explanation of our findings: We must assume that the virus of inclusion blenorrhea was present in our three infants in a latent form and that the use of a chemical irritant stimulated its growth so that it was found easily in preparations for from five to seven days, during which increased secretion was present. Against Thygeson's explanation are the facts that scrapings made before the instillation gave negative results, as did the scrapings after the short period of increased secretion and that no signs of the chronic stage of inclusion blenorrhea were present, which is a sequence of events unknown in inclusion blenorrhea. There seems to be no reason why the virus cannot be present in a latent stage or in an avirulent form, a condition known to occur in carriers of Bacillus diphtheriae or the meningococcus. The finding of inclusion bodies in the normal conjunctiva was reported by McKee[6] and by Addario.[7] Though the findings of the latter observer have been questioned, the illustrations of McKee seem to indicate that true inclusions were found in his two cases.

Following the report of Thygeson a paper by McKee[8] has just appeared in which he has expressed the opinion that the bodies found in inclusion blenorrhea are degenerated forms of gonococci. While

6. McKee, S. H.: Ophth. Rec. **19**:292, 1911
7. Addario: Arch. f. Augenh. **19**:197, 1910.
8. McKee, S. H.: Am. J. Ophth. **18**:36, 1935.

there can be no question that gonococci were associated with true inclusions in his cases, his evidence seems insufficient to justify his conclusion, especially when compared with that of Thygeson. The work of Stewart,[9] to which he referred in support of his opinion, is unconvincing. Stewart's illustrations would certainly fail to convince any one familiar with the morphology of inclusion bodies of their identity with degenerated bacteria.

It must not be concluded from the work of Thygeson that inclusion blenorrhea is the only form of nongonorrheal conjunctivitis of the newborn infant. One of us (Lazar[10]) in a study of eighty cases of ophthalmia of the new-born found gonococci in 36 per cent, pneumococci or streptococci in 13 per cent and other organisms (some not pathogenic) in 7 per cent, while in 7.5 per cent (six cases) inclusions were found. The inclusions were alone in three and associated with other organisms in three cases (gonococci, pneumococci and Morax-Axenfeld bacilli). In Thygeson's[11] series of seventy-seven cases of nongonorrheal conjunctivitis of the new-born, inclusions were revealed in only eleven, and the others were attributed to other organisms found.

Recently, Lindner[12] has expressed his present views on this relationship in a way which somewhat clarifies the situation. He does not believe, as he did originally, that the viruses of trachoma and inclusion blenorrhea are identical; he thinks they are closely related and, of course, that the inclusions in both diseases are morphologically indistinguishable. He has compared the relationship between them with that of the organisms of typhoid and paratyphoid. He has found that patients with trachoma are relatively, in some instances entirely, immune to inoculation with material from inclusion blenorrhea. He has formulated the theory that they once originated from the same virus but that the habitat of the trachoma virus on the conjunctiva and that of the inclusion blenorrhea virus on the genital tract have led to distinctive characteristics in the diseases produced when inoculation on the conjunctiva occurs. He suggests the name "paratrachoma" for what has been called inclusion blenorrhea. Swimming pool conjunctivitis he believes is a symptom complex of varying origin, some cases being due to the inclusion virus and others to other micro-organisms. We can agree to this as we have seen a number of cases, especially during an epidemic in 1933, due to the pneumococcus. The important monograph by

9. Stewart, D. S.: Ann. Rep., Gizeh Mem. Ophth. Lab., Cairo, 1933, p. 101.

10. Lazar, N. K.: Types of Ophthalmia Neonatorum Not Due to the Gonococcus, Arch. Ophth. **6**:32 (July) 1931.

11. Thygeson, P.: The Nature of the Elementary and Initial Bodies of Trachoma, Arch. Ophth. **12**:307 (Sept.) 1934.

12. Lindner: Arch. f. Ophth. **133**:419, 1935.

Morax [13] on this subject should be remembered, as the author reported a number of cases identical clinically with swimming pool conjunctivitis, in which infection from pools was excluded but in some of which inclusions were found. As to folliculosis, Lindner regards this as absolutely distinct from the inclusion diseases. He believes that, while it may be due to more than one cause, certain cases are due to Bacillus granulosis. While many of us may remain in doubt on this point, the importance of Lindner's work on trachoma and inclusion blenorrhea must be recognized and has gained in importance by the work of Thygeson.

For the relation between the inclusions of inclusion blenorrhea and those of trachoma and swimming pool conjunctivitis, another report by Thygeson [11] should be consulted. Further work is being carried out with Tilden along the line of Thygeson's work.

CONCLUSIONS

1. The work of Thygeson offers convincing evidence that a living agent, which may be called a virus, is present in inclusion blenorrhea, which is represented by the inclusion bodies, elementary bodies and free initial bodies found in scrapings.

2. Our findings in scrapings from the normal conjunctiva of babies treated with certain chemical irritants indicate that this virus may exist in a latent or avirulent form on the normal conjunctiva.

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13. Morax, V.: Les conjunctivites folliculaires, Paris, Masson & Cie., 1933.

SHORT STUDIES ON THE HISTORY OF OPHTHALMOLOGY

II. SIR JONATHAN HUTCHINSON, THE GREATEST "GENERALIZED SPECIALIST," AND HIS CONTRIBUTION TO OPHTHALMOLOGY

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In the winter session of 1849-1850, Jonathan Hutchinson, tall, dark and quiet, "with deep set eyes which seemed to peer through and beyond his vis-a-vis," was enrolled for the lectures at St. Bartholomew's Hospital, London—a man, who, by his own endeavors, before he reached his thirtieth year, was to exercise an enduring influence on the science of medicine and inspire to pursue deep investigation in clinical medicine a greater number of students than any other one man in modern times; a man destined, also, to affect ophthalmology profoundly for all time, whose personal observations, teaching and influence in that special field have been equaled perhaps only by the great von Graefe himself.

Hutchinson was born on July 23, 1828. He came of serious-minded Quaker folk in Yorkshire. He was educated by governesses at home. At 17 years of age, on Jan. 22, 1845, he was apprenticed to Caleb Williams, a Quaker physician and minister; but the next year he entered the school at the York Hospital, in certain classes of which he was the only pupil. The limited facilities of that small hospital aroused in the young student a desire to obtain more complete training, so he went to London for clinical instruction. There he resided and practiced for the next fifty years and became the greatest general practitioner in Europe. After attending a course of lectures and serving in the wards as dresser for Thomas Wormald at St. Bartholomew's Hospital he took the diploma of M.R.C.S., and returned to York, where for a few months he served as house surgeon at the hospital. But in 1851 he again went to London and there became identified with medical and scientific life until his death.

At "Bart's" he came in contact with two great practitioners, James Paget and William Lawrence, whose influence inspired him throughout his life. His association with Sir James, whom he was always proud to call his "Master," began when he resided at the "College." The hospital authorities, in their endeavor to provide a house where medical students might live and be under their general supervision and guidance,

established the College about 1845, in Duke Street, largely through the influence of Paget, who was made the warden. During the winter session of 1849-1850, thirty-two students were in residence; among them was Elizabeth Blackwell, the "first lady-doctor in London," who later became an influence in the medical education of women in America. The warden, who lived in the house, was not responsible for any but those resident in the College, yet as any student of the medical school

Fig. 1.—Jonathan Hutchinson (from photograph taken between 1850 and 1860 by the London Stereoscopic and Photographic Company).

could go to him for advice, it soon became his duty to advise nearly all the students as to their course of study.

Hutchinson must have been much affected by the surroundings and by the advantages of living in such close proximity to the hospital. His first interview with the warden was in regard to taking out a ticket for Paget's course of lectures on physiology and at the same time obtain advice as to presenting himself for examination at the school. After that he was a constant attendant at Paget's outpatient room and in the

wards whenever Paget had charge of them. His admiration for Paget's character and attainments was unbounded, and he never missed an opportunity to listen to his teachings. Few at "Bart's" surpassed him in his respect, which might almost have been called reverence, for his great teacher. Paget, in turn, must have been deeply impressed by Hutchinson, for he named him in his recollections of his years at the College.

Hutchinson was a conscientious, earnest youth, systematic as to the use of time, yet he was well thought of by his fellows, as he was elected president of "The Abernethian," the students' debating society. He was slow in deciding what his life work should be; he detested general practice, and his Quaker principles interfered with his accepting the offer of an appointment in the Army for service in the Crimea. At one time he had thoughts of becoming a missionary. To fit himself for such a life he sought to gain a sound knowledge of diseases of the eye and the skin by attending the practice at certain of the London hospitals. In the end, he decided to practice surgery and in 1851 he opened his office at 14 Finsbury Circus, then in the fashionable medical quarter of London.

Practice came slowly. During the months of waiting he, like other young surgeons, coached pupils for their examinations and began to write for the medical journals, thus acquiring the art of composition and laying the foundations of his vast literary output. His first essays were in the nature of weekly clinical reports, with comments on cases he had observed in hospitals. These he contributed as unsigned articles to the *London Times and Gazette*.

Hutchinson was omnivorous in his clinical studies; the subjects of his writings are extraordinarily varied. It would hardly be possible to give even an imperfect idea of his output, so great was the volume; moreover, his writings are scattered so far and wide in journals and magazines that certain of the originals to which he referred in later papers have not been located. Therefore, a bibliography could be given only after great labor.

In this article I shall endeavor to follow the progress of his course in practice through a few of his writings on subjects which have become of importance to the broadly experienced ophthalmologist. The diseases described have had a permanent place in ophthalmology almost from the days on which their author presented them to his audiences, and are ingrained in the science, certain of them being known by his name. Because in the passage of time the origins of Hutchinson's discoveries may have become obscured, it is my intention to give largely in his own words more or less extensive accounts of his observations and the history of his presentation of his papers and therein depict a shadow of the man and his times.

In 1852, Hutchinson sought a minor position as clinical assistant at the Liverpool Street City Hospital for Chest Diseases and, later, at the Hospital for Diseases of the Skin, in Blackfriars Road. Then he joined the recently formed Pathological Society of London, to the proceedings of which he contributed scores of reports and dissertations during the succeeding years. By 1854, he became associated with the Royal London Ophthalmic Hospital, "Moorfields," an association which con-

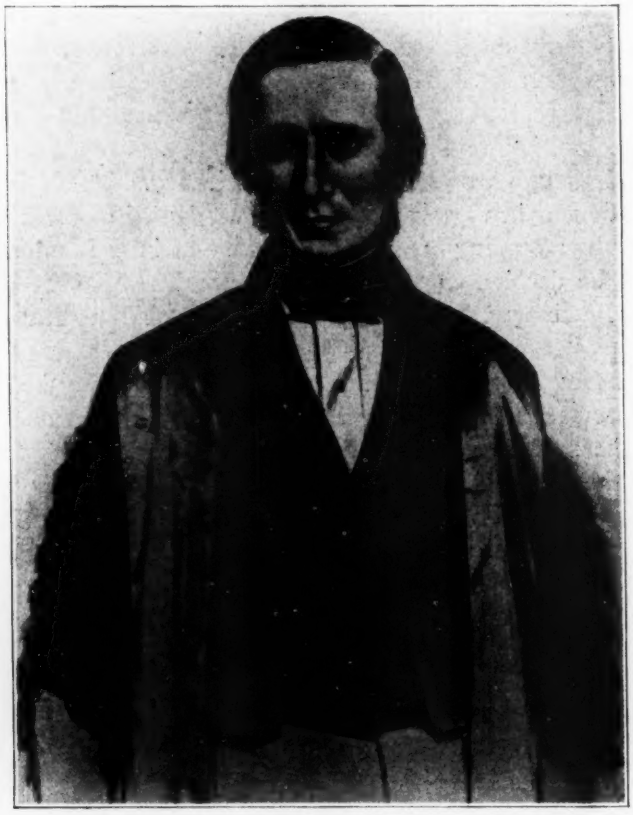

Fig. 2.—Sir James Paget (from "Memoirs and Letters of Sir James Paget").

tinued until 1878. In the meantime his connection with the London Hospital, where he had been an assistant surgeon since 1859, became more and more important; in 1863 he was made full surgeon, which position he held till 1883. These professional associations brought the quiet, somewhat solemn Yorkshireman to the notice of every prominent practitioner and teacher in London. Hutchinson had the extraordinary capacity of being able to correlate the studies he pursued in these various hospitals and to synthesize the knowledge and experience he gained in them so as to utilize the observations he made at one for the service of the others.

The house in Finsbury was not far from Moorfields, where Hutchinson spent most of his time. His unofficial visits led to an early appointment as assistant surgeon, and in 1862 he became surgeon, which position he held with great honor to the hospital and direct service to ophthalmology till 1878. Of the surgeons with whom he was associated at Moorfields might be named Dixon, George Critchett, Bowman, Streatfield, Lawson, Hulke, Couper, Soelberg Wells, and Poland, whose assistant he was.

Hutchinson early came under the influence of William Lawrence, who had done so much to increase the knowledge of venereal diseases of the eye. The young physician was led to emulate this master ophthalmologist and began to investigate the cases of suspected syphilitic

Fig. 3.—The London Ophthalmic Infirmary as first erected at Moorfields in 1822 (after plate in Collins' "History and Traditions of the Moorfields Eye Hospital").

patients reporting in the outpatient departments at Moorfields. He became as patient and as elaborate a note-taker as Lawrence. The subject of "inherited venereal taint, in its causal relation to various diseases occurring in periods of life more or less advanced from those of infancy" engaged his close attention for the next fifteen years. His interest had been awakened by a very severe case of so-called "strumous" disease of the bones of the skull in a young man whose mother had suffered from syphilis. He could find in books little or no information by which to be guided in a differential diagnosis between the remote effects of hereditary syphilis and those of ordinary struma. The signs of syphilis as met with in the infant were well described in them, but nothing definite appeared to be known as to the symptoms by which one might recognize the subjects of the taint in patients of more advanced

years. Many authors suspected that this taint was responsible for a large proportion of cases of so-called "scrofulous" disease, yet in no report could Hutchinson find any attempt to prove the fact or to define the limits of the extent of this disease.

It was at Moorfields especially that he became interested in the manifestations of congenital syphilis and obtained the material for his important discoveries of the effects of that disease, which affected the worst of London's poor. In the early days of Hutchinson's career the majority of persons admitted to the London hospitals were mechanics, laborers, tradesmen in reduced circumstances or servants; besides,

Fig. 4.—Sir William Lawrence, taken from "Sir William Lawrence" by Burton Chance (Ann. M. Hist. **8**:270, 1926).

numerous persons, particularly women, of the very lowest class of society and the worst character were admitted. At the London Hospital, which was established in 1740, but removed in 1759 to Whitechapel Road, the patients were chiefly watermen and laborers employed on the docks and on the quays in the east parts of London.

At the City Hospital for Chest Diseases and at the Hospital for Diseases of the Skin, from 1850 to 1854 he observed cases in young persons with a peculiar physiognomy in association with other suspicious symptoms, and, as he found, the not unusual evidences of past iritis. In 1852,[1] when he was but 24 years of age, he reported two cases of

1. Hutchinson, J.: M. Times & Gaz. **5**:216 and 218 (Aug. 28) 1852.

infantile iritis, and in 1858, while he was only clinical assistant at Moorfields, he began in the then recently established *Ophthalmic Hospital Reports* a series of papers on the general subject "Inherited Syphilis." In 1859,[2] he read at the Edinburgh meeting of the British Medical Association a paper entitled "On the Means of Recognizing Amongst Young Persons the Subjects of Inherited Syphilis." In his notes he had carefully recorded for each case the general appearance of the physiognomy and the condition of the interior of the mouth. In conducting these examinations he was led to notice the frequent occurrence of malformed permanent teeth. Soon he was led to consider the state of the upper central incisors to be by far the most reliable among the indications of inherited taint. His conclusions were embodied in several communications made to the Pathological Society during the

Fig. 5.—Portrait from a stereograph, showing the dwarfed and notched condition of the permanent teeth in hereditary syphilis.

sessions of 1857-1859. At about the same time there came prominently before him the fact that the disease known as "strumous corneitis" was never met with in practice except in conjunction with peculiarities of physiognomy and malformed teeth.

At a meeting of the Pathological Society of London, early in 1857, when he first remarked on the frequency of his cases, the reporting [3] of his findings of the "Effects of Infantile Syphilis in Marring the Development of the Teeth" aroused great interest among the members, and his statements were received with expressions of incredulity.

2. Hutchinson, J.: A Clinical Memoir, London, John Churchill, 1863, preface, p. x.

3. Hutchinson, J.: Tr. Path. Soc. London **9**:449, 1857-1858.

Hutchinson therefore determined to make public such evidence as he possessed on the subject. He accordingly gathered together a group of instances; Alfred Coleman, the dentist at the Metropolitan Free Hospital, assisted him by making casts of the teeth of the patients sent to him from Moorfields, where Hutchinson had them under his care

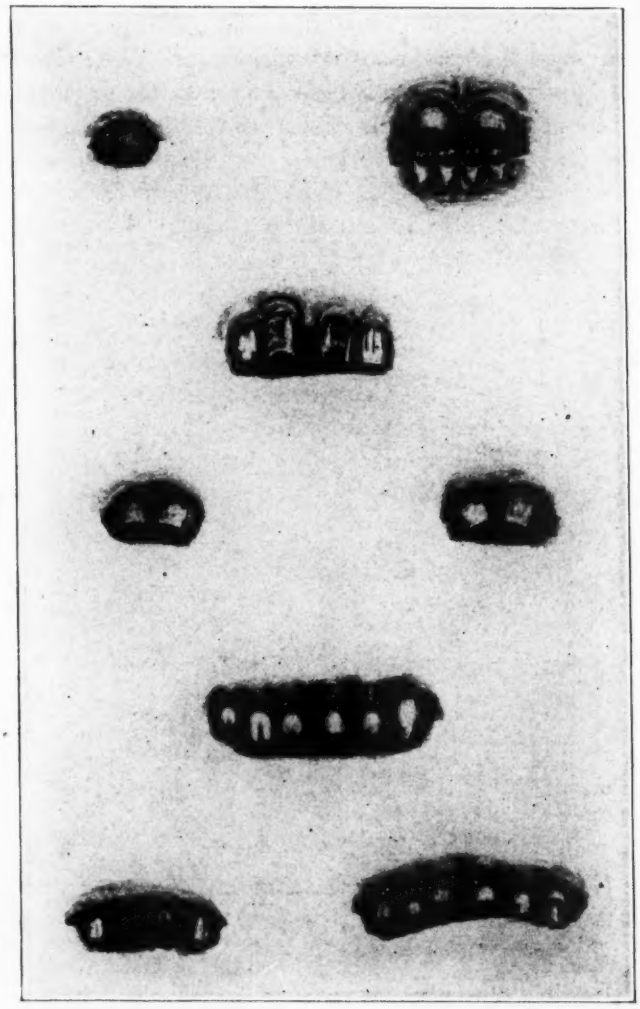

Fig. 6.—Appearance of the teeth in hereditary syphilis (from Hutchinson's "Clinical Memoir").

on account of what he denominated "chronic interstitial keratitis," a disease which he firmly believed was in most instances a result of inherited syphilis, although some others, particularly German clinicians, did not share this belief. He emphasized the fact that the dental defects were not at all similar to caries or other forms of decay. A photograph of each of the patients was also secured. Figure 6 represents a well

marked example of malformed teeth and suggests the peculiar physiognomy impressed by the disease.

The ages of the patients ranged from 5 to 28 years. The number of cases was thirteen, and in all a clear history of syphilis was established, either from the parents' confession of their own infection or by the accounts given of undoubted symptoms manifested during the infancy of the patient.

The syphilitic corneal disease affected by preference the eldest living child of the family, a circumstance to be expected under the hypothesis of syphilis, but wholly inexplicable under that of struma. In addition, females were affected in preference to males, and the condition occurred in families in which a large infantile mortality had been noted. The subjects of true struma, Hutchinson had observed, usually had large white teeth and often were blond, and any member of a family might be affected.

Hutchinson was fully aware of the infrequency of such cases as those he had presented in the practice of general surgeons, and had it not been for the field offered by the Royal London Ophthalmic Hospital he would not have been able to collect so many instances. In concluding his report, which was given at the meeting of the Pathological Society of London, on May 18, 1858,[3] he remarked that the state of the teeth was often of great use in enabling one to decide whether certain other symptoms presented by adult patients are the results of hereditary or acquired syphilis; it is impossible, he declared, for acquired disease to alter the form or size of the teeth; also, he stated, the condition of the teeth can determine whether the physiognomic appearance is due to congenital and not to acquired disease.

It was with difficulty that Hutchinson gained the acceptance by physicians of this sign as a positive factor in the diagnosis, and so unwilling was the Pathological Society to accept his announcement that a committee was appointed to examine other patients of his. He accordingly presented six. The committee reported:

> The previous existence of syphilis was substantiated in five, and the sixth was probably of the same character. The Committee were disposed to conclude the relation of cause and effect sought to be made out by Mr. Hutchinson is sustained by a careful examination of the cases referred to, but they hesitate to express a more decided opinion on the number of cases submitted to them. Mr. Hutchinson desires to offer further cases for examination, and the Committee, feeling the importance of the subject, have determined to meet again, and obtain this additional evidence on the subject.

It seems incredible today that any one should have disputed Hutchinson's pronouncements concerning the origin of the signs of this ocular disease. Frequent instances could have been observed in any group of patients in the waiting rooms of both hospital and private office. Because of the hesitancy of others to accept his conclusions,

Hutchinson was compelled to present evidences of anomalies arising in other parts of the body. Yet, in patients who were old enough to show them, by far the most reliable among the objective symptoms was the state of the permanent teeth. The central upper incisors he found to be usually short and narrow, with a broad vertical notch in their edges and their corners rounded off. Such teeth, he unreservedly declared, were pathognomic of hereditary taint, and ever since the sign has been known as "Hutchinson's teeth." The localized injection at the corneal limbus, producing a reddish or salmon-colored patch, seen during the course of interstitial keratitis, is spoken of as the "Hutchinson patch."

Next in value to the malformations of the teeth he found to be the state of the skin, the formation of the nose and the contour of the forehead. In patients with hereditary syphilis the skin is thick, pasty and opaque, pitted and with linear scars, many of which radiate from the angles of the mouth. The bridge of the nose is almost always broader than usual and is low; often it is remarkably sunk and expanded. The forehead is large and is protuberant in the region of the frontal eminences. The hair is dry and thin, and now and then the nails are broken and splitting into layers. In most cases degenerative inflammation of the internal ear takes place, so that the patient becomes deaf. Usually, the patients markedly resemble one another, and so pronounced are the facial features that the physiognomy has been found commonly to be the accompaniment of what has been called the "Hutchinson triad," comprising interstitial keratitis, notched teeth and labyrinthine disease.

Hutchinson's "Clinical Memoir on Certain Diseases of the Eye and Ear Consequent on Inherited Syphilis, with an Appended Chapter of Commentaries on the Transmission of Syphilis from Parent to Offspring and Its More Remote Consequence," published in London in 1863, consisted mainly of revisions of articles in the *Ophthalmic Hospital Reports*. He dedicated the work to Lawrence and remembered to acknowledge his great obligation to his colleagues at Moorfields—Dixon, George Critchett, Bowman, Wordsworth, Streatfield, Hulke and George Lawson—where he was, even then, only an assistant surgeon, for the assistance that they had given him in the prosecution of his inquiry. In his investigations he was early led to believe that the term "strumous," which was constantly applied to several inflammations of the eyes, ought properly to have been "syphilitic." To enable him to put this belief on a basis which would entitle him to ask for the assent of others, a large collection of facts was requisite. In his visits to many hospitals he had unusually good opportunities for collecting a series of examples of diseases which were reported but rarely at that time. He accordingly detailed histories of sixteen cases of iritis, sixty-four of

keratitis and fourteen of inflammatory opacities in the vitreous body, lens and other parts of the eye. He stated:

These became the stones out of which the edifice was built. . . . The profession very properly received wide assertions respecting the direct dependence of disease upon inherited taint with much skepticism. Peculiar difficul-

A CLINICAL MEMOIR

ON CERTAIN

DISEASES OF THE EYE AND EAR,

CONSEQUENT ON

INHERITED SYPHILIS;

WITH AN APPENDED CHAPTER OF

COMMENTARIES ON THE TRANSMISSION OF SYPHILIS FROM PARENT TO OFFSPRING, AND ITS MORE REMOTE CONSEQUENCES.

BY

JONATHAN HUTCHINSON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON SURGERY AT THE LONDON HOSPITAL; SURGEON TO THE METROPOLITAN FREE HOSPITAL; AND ASSISTANT-SURGEON TO THE ROYAL LONDON OPHTHALMIC HOSPITAL.

LONDON:
JOHN CHURCHILL, NEW BURLINGTON STREET.
1863.

Fig. 7.—Title-page of "Clinical Memoir."

ties, moreover, beset the attempt to prove anything respecting the remote effects of venereal disease. To those who appreciate the great difference in value of a principle made, probably, by evidence and one merely asserted, the above considerations would be a sufficient apology for what might otherwise appear prolixity.

In all cases he deemed it only fair that he might ask of those who were inclined to test the accuracy of his opinion that care be taken in the diagnosis in the cases that they offered to refute his declaration.

Sir D'Arcy Power,[4] in 1926, remarked:

> It is of interest to note that hardly anything has been added to our knowledge of these subjects since Hutchinson published his observations some sixty years ago. Many attempts were made to controvert them, but in no single point has their accuracy been disproved.

The terms "scrofulous" and "strumous corneitis" were replaced by "chronic interstitial keratitis," and they have not been used since.

As soon as a practical ophthalmoscope was invented Hutchinson became intensely interested in the introduction of the use of the mirror into clinical medicine, and from the first years following its invention he employed it constantly in his own studies and after he retired from active service at Moorfields. His first model was that devised by Donders; later he used a Morton model. In his Clinical Memoir he declared that the importance of employing the ophthalmoscope in all cases of impaired vision can scarcely be overestimated—a dictum as important today as in his time. In certain of the cases of inherited disease the degree of impairment of vision was not so great but that it might have been attributed to some other cause had the retinal disease not been demonstrated; indeed, in one case hypermetropia had been diagnosed and the patient instructed to wear glasses! If the precaution of ophthalmoscopic examination is observed, he taught, the surgeon takes but little risk of overlooking syphilitic iritis, for, when once seen, the changes are easily recognized. If patches of recent lymph are seen in the choroid, the suspicion of syphilis ought to be entertained just as promptly as it usually is in cases of iritis. Not all patients show signs of uveal disease, yet Hutchinson was sure that a large proportion of patients with both diseases manifest signs of present or antecedent inflammation. Not always can one be certain of the condition from the state of the pupil; iritis may not be accompanied by choroiditis; on the other hand, iritis may not be present in the majority of cases of choroiditis. In addition, the prognosis must be governed by the state of the fundus. In a small manual entitled "Syphilis, for Practitioners and Students of Medicine,"[5] published about 1887 by the Cassell Company, he honored ophthalmology by placing as the frontispiece four colored pictures of the fundus exhibiting syphilitic conditions. In the treatment of ophthalmic conditions he depended on mercurials and the iodides and sought to maintain the general health.

With Waren Tay, Hutchinson, in 1876,[6] described under the title "Symmetrical Central Choroido-Retinal Disease Occurring in Senile Persons" a group of cases exhibiting speckling of the choroid with

4. Power, D'Arcy: Brit. J. Surg. **14**:1, 1926.
5. Hutchinson, J.: Syphilis, London, Cassell & Co., Ltd., 1887, preface, p. viii.
6. Hutchinson, J., and Tay, Waren: Ophth. Hosp. Rep. London **8**:231, 1876.

minute yellowish dots in the neighborhood of the disk, with a few single dots in or near the periphery. Usually the dots were grouped, yet sometimes they became confluent. Both eyes exhibited remarkably similar changes, limited to the region of the yellow spot and disk. All the patients were healthy and past middle life. No cause was assigned. No previous description of such a condition had been made prior to this report; the picture constitutes what is commonly known as retinitis circinata, as defined by Fuchs. The disease has been known ever since as "Hutchinson's disease" or "Hutchinson's changes," as expressed by Goldzieher,[7] in 1887. Sir Jonathan always shared the honors with his assistant and colleague, Tay; although the patients were under Hutchinson's care, Tay made the ophthalmoscopic examinations, and it was he who drew attention to the peculiarities.

The two most important events in the history of British ophthalmology, it may be said, were the formation in 1880 of the Ophthalmological Society of the United Kingdom, and, on the retirement of Sir William Bowman from the presidency of the society, in 1883, the establishment of the "Bowman Lecture." The lecture was instituted with the design of gratefully commemorating the services of Sir William to the profession of medicine and, more particularly, those which he had rendered to the society in the capacity of first president. It was intended that the lecturer should on each occasion undertake the investigation of some special subject in connection with ophthalmology. Hutchinson was instrumental in organizing the society, and he was made vice-president. He was chosen to succeed Bowman and served until 1886, and he was selected to deliver the first of the lectures, which he gave on Thursday, Nov. 13, 1884.[8] He chose as his topic "On the Relation of Certain Diseases of the Eye to Gout."

At that time gout was extremely common among a large proportion of the British population, and accompanying involvement of the joints during the seizures were many different forms of inflammation of the eye, both in patients suffering from acute seizures and in others chronically affected by inheritance. In the course of his immense experience Hutchinson had accumulated statistics on cases in which inflammation of the eyes had been manifested during the course of attacks of gout. He desired to present the result of his observations as the subject of the lecture. He was well aware, however, that he might be accused of having "seen gout in everything"; nevertheless, it could not be denied that in the second half of the nineteenth century the so-called gouty constitution existed and was common in England, both in acute manifestations and by inherited transmission, besides being

7. Goldzieher, W.: Wien. med. Wchnschr. **37**:861, 1887.

8. Hutchinson, J.: Tr. Ophth. Soc. U. Kingdom **5**:1, 1884.

potent in the production of distinct disease in special regions. In relation to the multiform diseases of the eye, gout was productive of serious complications within the organ of sight, particularly the destructive iridocyclitis in children of gouty ancestry. Hutchinson was well aware that when clinical pathology should be advanced beyond its then present status diseases might become minutely classified, and he predicted that the time would come when other maladies would be recognized to be what was then included in the entity gout. He accordingly sought in the lecture to discover some of the extensions and limits of the domain of gout.

Hutchinson's first contribution to the programs of the Ophthalmological Society related to cases of recurrent intra-ocular hemorrhage in young men. Attention was called to this disorder by Eales of Birmingham, in 1880. Hutchinson, however, in 1881,[9] presented a report entitled "On a Case of Primary Intraocular Hemorrhage, First into One Eye and Subsequently, After a Long Interval, into the Other, with General Remarks on the Causes of the Occurrences" and described five cases in patients who had been under his observation for some years, the first of whom had been brought to his atttention by Tay, in 1877, at Moorfields. All the patients were young men without impairment of health, who, in the midst of their usual occupations were attacked by sudden and profuse intra-ocular hemorrhage. The extravasations commonly took place into the substance of the retina, breaking through into the vitreous. More or less complete absorption ensued, only to be followed by repetitions after intervals varying from one to two years. During the intervals vision recovered with surprising rapidity, yet the prognosis became grave, because after each repetition numerous large films hung in the vitreous. This extensive bleeding occurred without any premonitory symptoms, the globe being free from any condition of the anterior segment. The pathology was not understood. Constipation had existed in most of the patients, and some had a history of repeated epistaxis. In none was there an indication of the hemorrhagic diathesis. Hutchinson obtained a history of gout from certain of the patients, so he was inclined to assign the condition to that diathesis, because in some persons with gout he found hemorrhages into the conjunctiva and the effects of moderate cerebral hemorrhages. He regarded such hemorrhages in women as analogous to menstruation. In all the patients there was inequality of the circulation, which he believed was caused by lack of vasomotor control.

In his valedictory address at the sixth annual meeting of the Ophthalmological Society, on July 2, 1886,[10] he spoke of the honor of

9. Hutchinson, J.: Tr. Ophth. Soc. U. Kingdom **1**:26, 1881.
10. Hutchinson, J.: Tr. Ophth. Soc. U. Kingdom **6**:510, 1886.

having been made the second president of the society, an office which he ever looked on with pride, and stated that he placed high value on medical literature and on the duty of writing papers. He had not, he said, "the slightest fear of over-production"; indeed, he ranked "the study of recording the experience which falls to anyone's lot as amongst the most binding of those which attach to our profession," and would urge that "only by such means can we advance, and elucidate its errors."

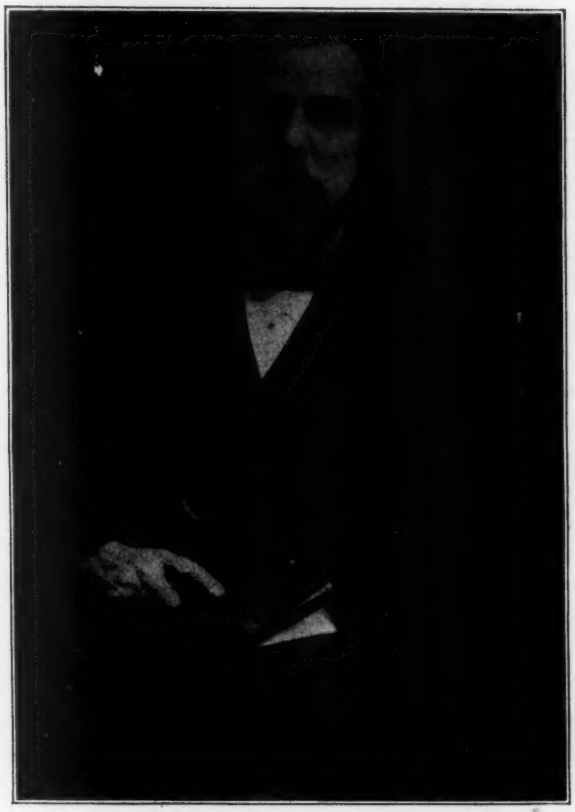

Fig. 8.—Jonathan Hutchinson about 1880 (from photograph by Barrand).

He insisted on "the great value which attaches to all case-narratives, when really complete, that is, which conduct the patient either to recovery or death." He made the plea that physicians should "work while it is day" and insisted that "it is not safe to delay the recording of experience or the enunciation of thought, which, for anything we know may prove of great value to those who follow us."

Sympathetic ophthalmitis was at that time engaging the attention of ophthalmologists throughout the world. Naturally, Huchinson anxiously sought an explanation for the disease. There were numerous

hypotheses current in the eighties, the chief one being the assumption that the second eye becomes infected "owing to disturbance produced in the hypothetical center for nutrition of the eyes." Another supposed that an inflammatory process, passes along the optic and ciliary nerves by a sort of "traveling neuritis." It was believed, therefore, that the nervous structures or the lymph spaces in connection with them are the paths by which the morbid process is conveyed from one eye to the other.

The next hypothesis assumed the circulation of the blood to be the means of conveying the infective material from one eye to the other. According to a theory advanced by Professor Berlin, in 1880, the wound of the injured eye becomes infected by germs from the atmosphere, which are taken up by the blood and transferred to the fellow eye in a "secondary septic infection." Leber and Snellen at that time expressed the belief that micro-organisms spread by direct continuity from eye to eye in the perineural lymph spaces. Hutchinson looked on this hypothesis as implying that all inflammations are infective, and that the selective infection of the opposite eye is due simply to the sameness of tissue.

In a forceful paper entitled "On a Blood Theory in Explanation of Reflex Ophthalmitis," read before the Ophthalmological Society in May 1885,[11] Hutchinson stated that he would not accept the idea that there was a trophic power in nerves or the suggestion that this disease might be "reflex" or "sympathetic"; indeed, he believed that the nervous system had nothing to do with it. He suspected the circulatory fluids rather than the nerves. He maintained that the modes of spreading of new growths as well as all forms of common inflammation to distant regions depend on infection of the blood, which has the power of inducing similar processes elsewhere. In addition, underlying the thought of general contamination of the blood, he believed that there is another mode of "selective affinity" which renders it likely that secondary processes are set up in certain definite parts to the exclusion of all others. Accordingly, elements are given off to the blood from the eye first injured which find in the course of the circulation their most favorable home in the tissues of precisely similar character in the fellow organ. In other words, an inflamed part sheds into the blood elements which may prove infective elsewhere, the parallel structures in the opposite half of the body exercising an attraction for these elements. He suggested that the process is dependent not on bacillar septicemia, but rather that the infective agents are cells produced or at any rate modified by the diseased part itself, and hence the process is not due to any infection from without.

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11. Hutchinson, J.: Tr. Ophth. Soc. U. Kingdom **5**:171, 1885-1886.

Under the title "Clinical Data Respecting Cerebral Amaurosis" Hutchinson, in 1864,[12] described in the first volume of the *London Hospital Reports,* and, in 1867 the Royal Medico-Chirurgical Society of London published in their transactions for that year [13] a statistical summary of his experience during the intervening three years in regard to cases supposed to be connected with indulgence in tobacco. In 1873, the reports were augmented by those of a third series of cases which had come under his notice from 1867 to 1870 under the title "Statistical Details of Four Years' Experience in Respect to the Form of Amaurosis Supposed to Be Due to Tobacco." In this series he was assisted by Nettleship and Tay.[14] It was estimated that a hundred patients with this condition were admitted to Moorfields every year, only a few of the subjects being women. All the patients were heavy smokers, but were in good health; the only evidences of disease were loss of sight and primary atrophy of the optic disk. Hutchinson was careful to distinguish between these cases and cases of secondary atrophy which had been preceded by neuritis. Only the former were tabulated, and only those in which sight had failed equally in both eyes were considered. Hutchinson did not express a definite opinion, yet he urged that the evidence that he submitted was sufficient to make it an important duty on the part of the surgeon to advise abstinence from tobacco whenever the early symptoms of the disease became manifest. However, he was forced to take notice of certain cases of amaurosis which occurred in male nonsmokers, and occasionally a woman [14] who presented exactly parallel symptoms and who had never used tobacco came under observation. Recovery took place in all his true cases when the cause was removed; only in smokers, therefore, was the prognosis favorable. The general immunity of the majority of smokers he assumed to be due to the fact that tobacco acts prejudicially only in persons with certain peculiar constitutions.

From early times in the history of ophthalmic surgery small isolated pyramidal opacities on the front of the lens had been recognized, for which the term "central cataract" had been used. Hutchinson pointed out in "Clinical Notes on Pyramidal Cataracts, with Speculations as to Their Cause" [15] that confusion is likely to arise in speaking of these as "central," when that term is so commonly applied to nuclear cataracts, particularly as the small opacities are subcapsular. He therefore suggested the term "pyramidal," and in speculating as to the cause concluded that they are secondary to the effects of ulceration of the cornea arising in the course of purulent ophthalmia in infancy.

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12. Hutchinson, J.: London Hosp. Rep. **1**:33, 1864.
13. Hutchinson, J.: Tr. Roy. Med.-Chir. Soc. **32**:411, 1867.
14. Hutchinson, J.; Nettleship, E., and Tay, W.: Ophth. Hosp. Rep. London **5**:191, 1866; **6**:46 and 181, 1869.
15. Hutchinson, J.: Ophth. Hosp. Rep., London **6**:136, 1867.

In the same year—1867—he encountered his first reported [16] cases of retinitis pigmentosa, then, so far as it had been recognized in England, a most rare disease, though von Graefe had been aware of its occurrence as early as November 1853. Because two of Hutchinson's patients were father and daughter, he almost instinctively sought for evidences of "familial transmission" of the disease.

Hutchinson was essentially a teacher, and he early had the greatest following of any one of his time. Success and fame came through this corps of adherents and admirers, from whom he early gathered around himself a large number of able assistants of whose devoted services he was able to make material use, especially at the London Hospital, where he conducted a course in ophthalmology, and at Blackfriars. At Moorfields, he was ably assisted by the brilliant yet modest Edward Nettleship and Waren Tay.

He was regarded by Byers [17] as "the very highest type of clinical teacher" and "one of the most interesting, inspiring and honorable of men." He was conservative in his methods and sincere in all his obligations. He could not be attracted to refraction, and when at Moorfields, the number of patients requiring this procedure had so increased that he could not conscientiously carry on, he resigned, turning all the work over to Nettleship and Tay.[18]

While secretary of the New Sydenham Society, Hutchinson induced Professor Donders to prepare an English edition of his essays entitled "Ametropia" and the enlargement of their subjects, which Donders had already planned, in Dutch, with the result that there appeared the great work "On the Anomalies of Accommodation and Refraction of the Eye," translated by Dr. William Moore, dedicated to William Bowman and published in London in 1864, which has continued to be the permanent classic in regard to both theory and practice on the topics embraced by it.

Hutchinson believed that it is the duty of specialists, in the cultivation of their particular fields, to bring together all the fragments of special knowledge which they might gather for the elucidation of the problems of general medicine. It was under some such sense of obligation that he brought to the attention of the Clinical Society of London certain facts in reference to cases of multiple hemorrhages into the structure of the retina. At the time of the reporting, on March 22, 1878,[19] Hutchinson's group comprised fifteen cases, to all of which the term retinitis haemorrhagica was applicable. The hemorrhages were

16. Hutchinson, J.: Ophth. Hosp. Rep., London **6**:39, 1867.

17. Byers: Brit. M. J. **1**:1398, 1913.

18. Collins, E. T.: History and Traditions of the Moorfields Eye Hospital, London, H. K. Lewis & Co., Ltd., 1929, p. 148.

19. Hutchinson, J.: Tr. Clin. Soc. London **2**:132, 1878.

numerous and abundant and were probably the earliest phenomena of the disorder. The whole fundus became speckled or streaked over with blood, and in none of the cases were there white deposits such as occur in albuminuria. The condition was illustrated by two drawings in colors. The extravasations never occurred in young persons, but always in those who had passed middle life, and usually but one eye was affected. Frequently a direct history of gout was obtained; indeed, in six of the cases gout had been present. The author bore in mind, however, the possibility of cardiac hypertrophy, with arteritis, and the likelihood of the effects of accidental strains on the blood vessels as the cause of the retinal picture. Or there might have been venous obstruction, either by external pressure on the vessel or by the formation of a thrombus within its interior. Moreover, he ventured to suggest that the blood content itself might have undergone change.

By his fellows Hutchinson was regarded as not a remarkably deft or rapid operator. His excellent judgment and coolness, however, enabled him to attain very good results. It is worthy of remark that he published few reports describing his ophthalmic surgical technic.

In a letter written about 1862 he recorded: "Last week I did three pairs of eyes for cataract and all have done beautifully. I have operated on a great number this summer and with capital results."

General surgery was Sir Jonathan's main business in life, yet he never lost interest in clinical ophthalmology. He had control of sixty beds, and he was followed in his rounds by eager crowds of students whom he was engaged to instruct in clinical and systematic surgery.

He is remembered by the general surgeons of today for pointing out, in the Astley Cooper Memorial Prize Essay for 1865, that in injuries of the head with rupture of the middle meningeal artery it is possible to tell by the state of the pupils on which side the rupture is. This inequality of the pupils has been denominated the "Hutchinson pupil." The essay was never published, but, with its drawings, remains the property of Guy's Hospital.

In both his private and his hospital practice Hutchinson was ably assisted by his son, Jonathan Jr., the fourth of the name. The younger Jonathan was, like his father, deeply interested in ophthalmology and contributed several valuable papers to various journals.

The issues of the *Archives of Surgery* from 1889 until Hutchinson's retirement in 1912 were collections of reports of his own many cases drawn from the records that he had made from all the departments of his interests. In the first volume, in which a section "Diseases of the Eye" was provided (page 34), appeared the following interesting reports: "On the Increase of Tension in the Course of Syphilitic Keratitis"; "Simulation of Retinitis Pigmentosa in Acquired Syphilis":

"Senile Diabetes with Extensive Disease of the Choroid and Retina in Both Eyes," and "Choroiditis with Extensive Atrophic Changes Like Those of Retinitis Pigmentosa." In succeeding numbers of the *Archives* were reports of cases of interest to ophthalmologists.

Hutchinson was the foremost syphilographer of his time in England; his detailed accounts of cases of patients exhibiting every possible manifestation of that bizarre disease are extraordinarily keen in their description and vividly portray the visible lesions. He firmly believed syphilis to be, like other acute specific diseases, a specific fever. He was baffled by the apparent mystery of the origin of the disease; all his days he believed that the malady is activated by a specific microbe on which the contagiousness and transmission depend, and that it continues to be potent only so long as that microbe retains its vitality. Until the end of his days he lamented that although bacteriology had cleared up many dark spots, it had not been able to discover the organisms of syphilis. Nevertheless, as early as 1890, he was confident that the discovery was in reserve for some future investigator. In 1909, a second edition of his book [20] was issued, in which the Spirochaeta pallida, which was discovered by Schaudinn in 1905, and the "Wassermann reaction" as a means of diagnosis, which was perfected in 1906, are noted.

In reviewing Hutchinson's observation of cases of syphilis over many years, Sir James Paget,[21] in 1876, at a meeting of the Pathological Society, said that he would venture to make himself proud in calling Hutchinson one of his pupils, although not his pupil in syphilis, with regard to which he would say nothing but that at least he did not interfere with Hutchinson's studies while Hutchinson pursued them with himself in the outpatient room at St. Bartholomew's Hospital, where he saw nothing but confusion, and Hutchinson saw light coming. Throughout his professional life Hutchinson regarded himself as a pupil of Sir James Paget in "a stronger sense than those words necessarily imply." During the long years of their friendship he enjoyed many opportunities of becoming acquainted with Paget's views on pathologic subjects. So intimate was the association that Hutchinson later declared that he felt in doubt as to whether he was developing thoughts of his own or those of his teacher; the germs of many of his ideas, he freely admitted, were Paget's.

Hutchinson took the widest interest in all abnormal conditions of the general body, as well as of the eye. In regard to neurology, although he personally added nothing, he published many excellent reports, especially those in cooperation with Hughlings Jackson, with whom he was

20. Hutchinson, J.: Syphilis, ed. 2, London, Cassell & Co., Ltd., 1909.

21. Paget, J.: Tr. Path. Soc. London **27**:373, 1876.

intimately associated in clinical work, their studies of syphilis having brought them in contact with many varieties of nervous diseases.

In March 1875,[22] Hutchinson, in "Imperfect Teeth and Lamellar Cataract," recalled to the minds of physicians the generally well known fact that children with cataract usually show also badly developed teeth. The dental anomaly consists in absence of the enamel of the incisors, canines and the first molars of the permanent teeth. In his experience, the dental deformities had been seen not in the commonest type of congenital cataract, but only in the lamellar or zonular form. He refuted the commonly accepted supposition that the malformations were connected with inherited syphilis, but expressed the doubt that they were associated with rickets and with general defects of development.

Some years previous to Hutchinson's report, Arlt had observed that persons with lamellar cataract usually had suffered from convulsions in infancy; these observations Hutchinson confirmed, for he too had seen a direct connection between the occurrence of convulsions and the development of lamellar cataract. He was inclined to believe that the dental defects seen in his patients were due to the influence of mercury that had been administered to the patients in their infancy for the cure of the convulsions. He did not believe that lamellar cataract has any connection with hereditary syphilis. While he had seen such cataracts in persons showing general defects of development and disturbance of the osseous system, he could not regard his patients as rachitic. He admitted, however, that the peculiarities mentioned might be due to disturbance of the nervous system in infancy in connection with convulsions. Later investigation has proved that Hutchinson's theory is inadmissible, for the dental anomaly is not caused by stomatitis, but is due to developmental deficiency. It is now known that such teeth are "rachitic," probably owing to disturbed calcium metabolism—a parathyroid deficiency—manifested in the permanent teeth; that the lenticular changes usually begin before birth, and that "rachitic disease" commonly appears before the secondary dentition.

In the April 1878 issue of *Brain*[23] Hutchinson began a lengthy article entitled "Notes on the Symptoms Significant of Different States of the Pupil," in which the reactions of the iris in both health and disease were explained and all the states of the pupils known at that time described.

Before the Royal Medico-Chirurgical Society of London, on Feb. 11, 1879, he gave his famous description of a condition which had been described by von Graefe as "ophthalmoplegia progressiva," but to which Hutchinson gave the name which was later adopted in the

22. Hutchinson, J.: Tr. Path. Soc. London **26**:235, 1875.

23. Hutchinson, J.: Brain **1**:13, 155 and 454, 1878-1879.

classification of diseases: "ophthalmoplegia externa, a symmetrical paralysis of the ocular muscles." [24] The eyes are motionless, the lids drooping over them, giving the patient the appearance of being half asleep. Both eyes are affected, but the paralysis rarely affects all the muscles; sometimes one or two escape. The drooping, or ptosis, is seldom complete. Hutchinson was the first among English authors to call attention to this symptom complex, and it since has been known as "the Hutchinson facies." He found it to be a disease of adult life, manifested in men who had had syphilis many years before the onset of the paralyses. He reported fifteen cases, in two of which the patients were under the care of Waren Tay. The optic centers were affected in certain of them marked by complete blindness due to white atrophy of the optic nerves. As the disease had involved the motor nerves and nuclei, Hutchinson likened the condition in his cases to disease of the anterior cornua of the spinal cord leading to progressive muscular atrophy.

Hutchinson became as great an authority in dermatology as in other departments of medicine. He collected many rare instances and described many conditions which were later "rediscovered" by others in foreign countries. He manifested the deepest interest in modern developments and continued to be a member of the staff at Blackfriars till 1897.

Shingles affecting the forehead and nose, which was then classified as "herpes zoster frontalis seu ophthalmicus," was scarcely recorded by ophthalmic surgeons and by authors who wrote on diseases of the skin until Hutchinson called attention to it in 1866. He believed that the disease was more frequent than was generally supposed; in 1865, he was consulted privately by three persons, and a considerable number of patients came under his care at the different hospitals with which he was connected.[25] One case was that of a boy. Most of the surgeons with whom Hutchinson conferred confessed that they had never seen such a case, and that they regarded the condition as rare; indeed, they doubted its existence. However, by 1869 he had collected the reports of no less than forty-one cases from his own records and those of others. Because the disease was then regarded as rare, he thought it proper to describe it in detail, and as he had so many examples of cases which had been carefully observed and recorded, he believed it safe to write the history of the disease. In his reports he included those of cases displaying unusual features and pointed out that whenever the side of the nose to its tip showed vesicles the cornea became

24. Hutchinson, J.: Tr. Roy. Med.-Chir. Soc. **62**:307, 1879.

25. Hutchinson, J.: Ophth. Hosp. Rep., London **5**:191, 1866; **6**:181 and 263, 1869.

severely inflamed. The condition in all the cases supported his inference that the nutrition of the eyeball is endangered only when the disease affects the oculonasal twig, a circumstance which is made apparent by the appearance of the eruption on the tip of the nose.

When Hutchinson began practice, ophthalmology as a distinct branch did not exist; even as late as 1872 most practitioners were engaged either as surgeons or physicians. Bowman and Critchett were the only physicians at Moorfields who did not hold surgical positions in other hospitals. In the years from 1852 to 1865, not all had such opportunities as those of which Hutchinson took advantage. The persistence of his studies, the accuracy of his descriptions and the readiness with which he made them known to the world incited others to follow if not to emulate him, so that before long ophthalmology in England, in the creation of which Hutchinson played no small part, began to be truly a division of medicine, receiving the respect of the profession. In all the spheres of his early usefulness Hutchinson's fellow workers were mostly his elders, teachers and seniors in hospital practice and venerable practitioners. It is interesting to discern in the proceedings of the meetings in which Hutchinson took part the gradual growth of confidence in the reliability of his clinical knowledge, and as one reads his early reports one is impressed by the avidity with which he had accumulated his material, the patience with which he had studied the symptoms of the diseases described, the depth of his inquiries and the closeness of his attention to the details of the patients' history, the accidents and facts of their social state. He constantly sought to observe the course of the patient's life from birth to recovery or the grave. Thus he was enabled to comprehend the heredity of disease and in all cases preserve the links which formed the chain uniting the local disorder with the economy of the whole person. Hutchinson's influence on clinical ophthalmology, therefore, may be regarded as having been greater than that of any physician of his time in England, if not on the continent of Europe, and by 1870 he was surrounded by earnest and enthusiastic young men who were advancing the science by their studies and investigations on the physiology and pathology of the eye. Of special mention are Hughlings Jackson, Waren Tay, Clifford Allbutt and Edward Nettleship. Jackson was about Hutchinson's age, and the latter depended much on him, as well as on Tay; for some time they lived with Hutchinson and his family, as did Nettleship, who became Hutchinson's secretary and intimate friend.

Nettleship [26] in his eulogy declared that if Hutchinson had done nothing else than what he did in ophthalmology that alone would have

26. Nettleship, E.: Ophth. Rev. London **32**:225, 1913.

entitled him to a place of high honor. It was because of all this that he was elected president of the Ophthalmological Society so many years after his resignation from Moorfields. In the course of an address, in 1865, when President of the Hunterian Society, he expressed his opinion that "the special part of ophthalmic medicine and surgery is small and can be easily taught and acquired, but the general part is large and necessitates familiarity with the whole range of pathology and therapeutics."

His discoveries were objective; indeed, he was a pure clinician. A student of the living, the patient and the patient's family and their inheritance became his "laboratory material." He seldom studied the dead body or its tissues. He confessed toward the end of his most active days of practice that he had worked but little in the postmortem room and still less in the laboratories. None the less he kept abreast of the times and at 80 was intellectually the equal of any physician working in his fields. All his life he had been a keen observer, gathering facts which he employed to make comparisons between apparently dissimilar diseases, between some of which he occasionally found a fundamental relation. He was always intensely interested not only in the natural history of disease but in natural history in general. His was a mind like John Hunter's. No one in the history of medicine in England made so many careful observations on so many diseases.

He was a patient and elaborate note-taker, a great collector of facts, marshaling them into groups on which he built up ingenious theories, such as the idea that leprosy is induced by the ingestion of fish—his so-called "fish hypothesis." [27]

He endeavored, however, to make his observations harmonize with theories of his own conception. In the reports of his discussions of his cases at society meetings it is interesting and sometimes amusing to read the criticisms of his theories by the members and of Hutchinson's efforts to sustain his argument. Sometimes his deductions might be declared to be "not justified by the facts" or "untenable," yet he could not be shaken in his declarations of them. Not all his papers are of equal merit, yet he wrote few that even today do not repay perusal and contain material for thought.[28] Osler [29] regarded Hutchinson as "the greatest generalized specialist of his generation, the last of the polymaths, the man at home in all spheres of medical sciences."

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27. Hutchinson, J.: On Leprosy and Fish-Eating, London, Constable & Co., Ltd., 1906.

28. Nettleship, E.: Ophth. Rev. London **32**:226, 1913.

29. Cushing, Harvey: Life of Sir William Osler, Oxford, Clarendon Press, 1925, vol. 2, p. 233.

He vividly illustrated his lectures and discussions by specimens and drawings which he gathered in a great collection. He was a firm believer in the value of pictorial illustration as an aid in acquiring clinical knowledge; possessing a highly developed visual memory, he would amaze his listeners by readily recalling the characters of cases which he had not seen for many years previously, the details of which were confirmed by the exhibition of drawings which he had not consulted since the days when they had been made. He was not an artist, but was forced to rely on others to depict what he decided to include in the numerous atlases he produced.

On the advice of Paget, in 1894, after much hesitation, for he liked the Finsbury region, he removed to 15 Cavendish Square, where he resided until his retirement in 1911. He had for his neighbors from time to time such distinguished consultants as Gull, Jenner, Quain and Sir Andrew Clark.

Some years previous he had purchased the first tract of what became his 300 acre farm at Haslemere, Surrey, where he spent his resting periods and to which he retired when he gave up his activities in London. He seldom took a holiday; even his journeys to Africa and India were in the interest of science.

In his lifetime he held honorary degrees from Cambridge, Edinburgh, Oxford, Dublin and Leeds. He was at various times president of the Royal Medico-Chirurgical Society of London, the Pathological Society of London, the Hunterian Society, the Ophthalmological Society of the United Kingdom, the Medical Society of London and the Neurological Society of London. In 1882, he was elected a Fellow of the Royal Society of London. On Feb. 14, 1891, he had the honor of delivering the Hunterian Oration[30] before the Royal College of Surgeons, in which he analyzed the life and works of John Hunter.

His private life was led in great simplicity in scientific occupations until the end, on Jan. 23, 1913, when he was 84 years of age. He had married in 1856, and was the father of ten children; his wife died in 1886.

The medical profession throughout the world has been influenced by his teachings and discussions, and the number and variety of his contributions to science, many of which will always be associated with his name, are enormous.

It is difficult to appraise Hutchinson, for he was devoid of all thought of personal advancement and reputation. In 1908, he was knighted by King Edward; surely, as Osler declared, a belated recognition of

30. Hutchinson, J.: Arch. Surg. London **3**:1, 1892.

the honor intended to show a nation's appreciation of a man's service to his country. It is stated that Hutchinson had declined to accept that honor earlier.

The inscription on his tombstone echoes his inmost characteristics: "A Man of Hope and Forward-looking Mind."

The material for this essay was gathered from many sources. Besides the sources indicated by the references, numerous items were derived from personal communications from certain surviving acquaintances of Sir Jonathan and from his sons, Dr. Roger Hutchinson and Herbert Hutchinson, who sent several photographs of their distinguished father, which have here been reproduced.

PRIMARY MELANOSARCOMA OF THE OPTIC DISK

JOSEPH LEVINE, M.D.
NEW YORK

REPORT OF A CASE

J. M., a 53 year old, married Puerto Rican, came to Dr. Manuel Monserratte in July 1934 to have his reading glasses changed. Tonsillectomy had been performed by Dr. Monserratte a year previously. Early in 1933 a pigmented mole, about ¼ inch in diameter, had been excised from the right thigh because of persistent itching. The scar was in good condition, showing no redness or thickening and feeling soft and pliable, with no tenderness. In the summer of 1932 there had been a positive Wassermann reaction of the blood, and the patient had received treatment; Dr. Monserratte found the reaction to be negative in July 1934. The family history revealed nothing significant.

Ocular examination revealed vision of 20/40 without correction and of 20/15 with correction for low grade hyperopia in each eye. External examination of both eyes revealed no abnormalities. The left fundus was normal, but the right showed a protrusion of the upper temporal portion of the optic disk into the vitreous for a distance of 3 diopters. This portion of the optic disk was markedly bluish as compared with the normal pink below. The temporal and upper margins of the disk were entirely obscured by retinal edema, but the remainder of the fundus, including the vessels, macula and periphery, was normal. The visual fields were not mapped. After consultation with several ophthalmologists, Dr. Monserratte enucleated the eye on July 10, 1934, under local anesthesia, for tumor of the optic disk.

Pathologic Report—The enucleated globe measured 24 by 23 by 22 mm. and was entirely normal in size and shape. The optic nerve was cut extremely close to the globe, revealing a blue-black area in the cut portion of the nerve which was 1 mm. in width. This occupied almost one quarter of the surface of the transversely cut nerve and its sheaths, which together measured 4 mm., the nerve alone measuring 2.5 mm.

The entire globe was normal except for the optic nerve and the disk. A densely pigmented mass occupied almost the entire upper half of the disk and extended with the latter into the interior of the eye for 2 mm. The retina had been artificially detached, but at the temporal edge near the disk it was pushed temporally and was moderately compressed. There some pigment-laden cells were present in the rod and cone and outer and inner nuclear layers, but the remainder of the retina was entirely normal (fig. 1).

The tumor evidently originated in the upper temporal part of the disk in front of the lamina cribrosa and grew forward and somewhat nasally, pushing the papilla into the vitreous humor and bending the columns of nerve fibers and their supporting tissue nasally. Posteriorly it had encountered some resistance in piercing the lamina cribrosa but was apparently successful in one area. The lamina was pushed back farther than normal, but it apparently gave way finally and permitted the tumor cells to displace it and pass through it into the nerve proper behind the eyeball (figs. 2 and 3).

From the laboratories of the Manhattan Eye, Ear and Throat Hospital.

The entire mass was extraordinarily pigmented and grew rapidly, but apparently it was removed soon after its inception, as evidenced by the entire lack of areas of degeneration in the tumor. There were pigment-bearing cells in the lumen of the central retinal artery and many tumor cells in its walls. The choroid was entirely spared in all the sections studied, and even where the tumor mass entirely surrounded it, the choroid was not invaded by tumor cells (fig. 4). Evidently the tumor originated in the portion of the nerve which passes directly through the funnel-shaped opening in the sclera into the retrobulbar portion of the nerve. Back there beyond the lamina the tumor spread out and became wider. The mass was wide and prominent in front of and behind the lamina, but the latter acted like a bottle neck and constricted the tumor at that point. In other words, it acted as does the lamina vitrea of the choroid, which causes a melanosarcoma to take on a mushroom-shaped appearance. There were a few tumor cells in the pia mater

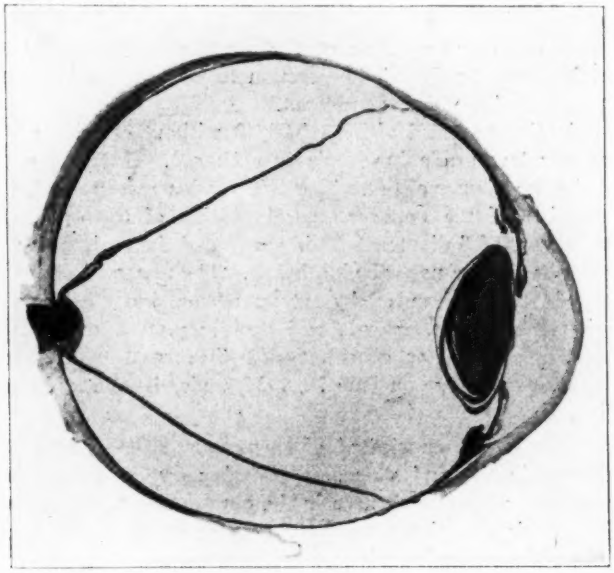

Fig. 1.—Cross-section of the globe showing the pigmented tumor in the optic disk and nerve. The retina was artificially detached.

but none in the arachnoid or dura. The depigmented sections showed that the tumor consisted of round and spindle-shaped sarcoma cells.

A transverse section of the distal portion of the optic nerve, which was removed with the globe, showed that the pigmented tumor occupied approximately one quarter of the area of the upper portion of the nerve (fig. 5). The tumor cells had destroyed and displaced the nerve tissue by invading first the supporting tissue of the nerve bundles and then the nerve tissue, which had been compressed in that area. The connective tissue septums at the periphery of the tumor had already been invaded by tumor cells, and the nerve bundles in those areas were more oval than normally as a result of the compression. The nerve fibers then underwent pressure atrophy, their place being taken by tumor cells (fig. 6).

There was no pronounced proliferation of glia cells, although some had ingested pigment and were acting as phagocytes. However, no evidence of an inflammatory reaction was seen in the nerve and no attempt had been made by the

glia cells to wall off the progress of the tumor. There were large paler-staining cells in the septums and nerve bundles—proliferating cells. Near them were smaller cells with deeply staining nuclei which were glia cells in their normal condition. The large spindle-shaped, pigment-laden cells were the tumor cells. There was no evidence of reaction around the central vessels of the optic nerve,

Fig. 2.—Photomicrograph of the cross-section of the tumor of the optic papilla and nerve shown in figure 1.

and one of the branches of the central vein already had pigment-bearing cells at its walls which were both sarcomatous and glial. No new phagocytic cells were being produced by the endothelium of the vessels (fig. 7).

The tumor was most densely pigmented at its central portion, with complete destruction of the nerve tissue extending from the pial sheath into the nerve proper

toward the central vessels. Apparently the resistance offered by the dural sheaths was much greater than that of the nerve tissue and permitted rapid destruction of the latter.

Progress of the Case.—In August 1934 Dr. Robinson applied radium to the right orbit after the patient refused to have an exenteration performed. No roent-

Fig. 3.—Photomicrograph of the section shown in figure 2 with the pigment removed. Note how the lamina cribrosa is bowed back in the region of the tumor and not pushed forward, showing that the tumor is growing back from the disk into the nerve and not forward from the nerve into the disk.

genograms were taken to determine the presence of metastases to the lungs or to the long bones. No clinical evidence of hepatic involvement was found. The

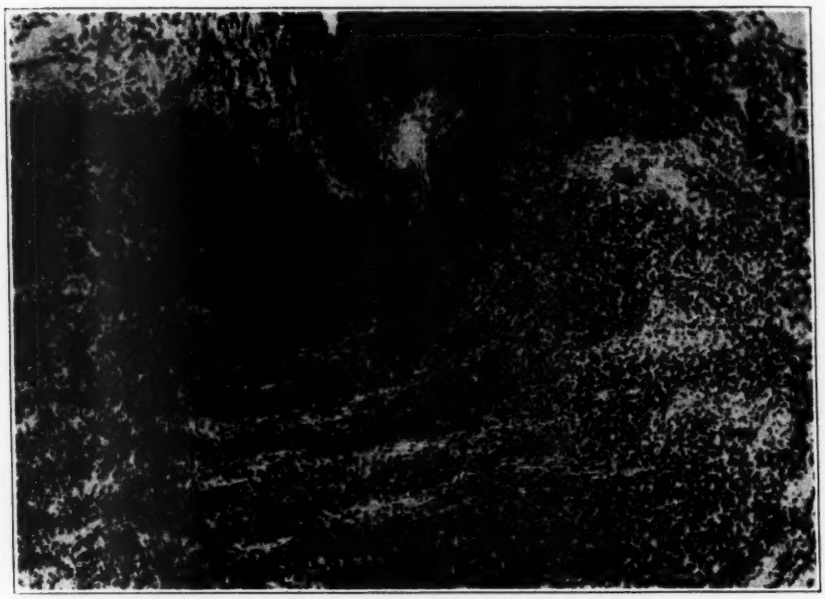

Fig. 4.—Higher magnification of the section shown in figure 3 through the upper portion of the tumor. The lamina vitrea is intact (this is also seen in figure 3), and the tumor cells are clearly seen.

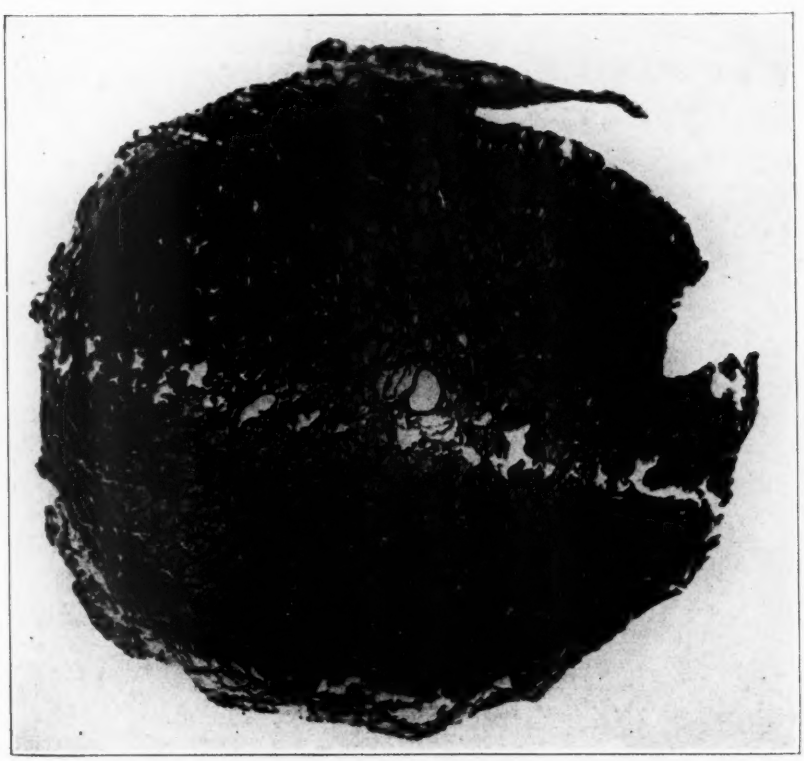

Fig. 5.—Cross-section of the optic nerve showing the relative size of the tumor.

Fig. 6.—Higher magnification of the section shown in figure 5. The tumor cells are seen growing into the healthy nerve bundles.

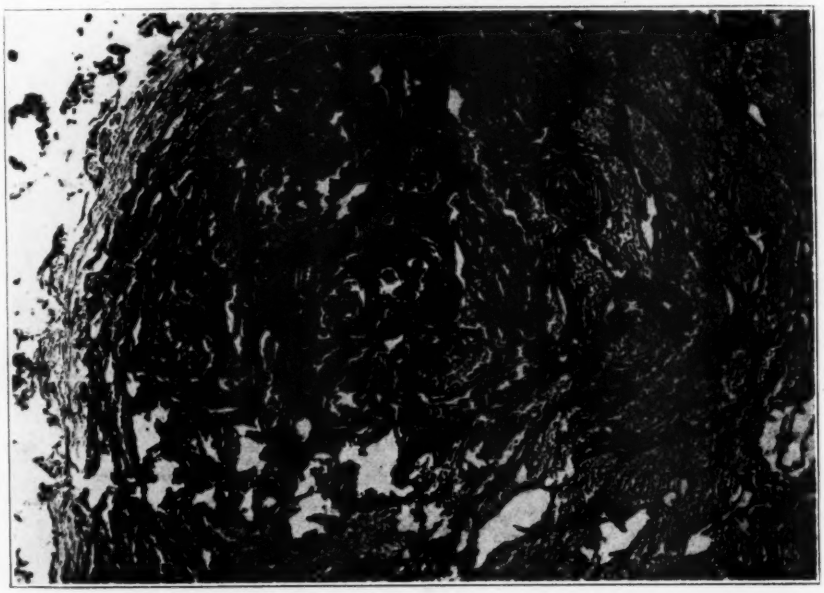

Fig. 7.—Cross-section of the distal portion of the optic nerve showing the pigmented tumor cells completely taking the place of the bundles of nerve fibers. Some of the connective tissue septums are clearly visible.

patient returned to his home in Puerto Rico early in September 1934, and in a communication received from him in December he reported that his health was excellent.

COMMENT

In consideration of the amount of pigment present, it was surprising that the tumor cells were not more closely and densely packed together. Melanosarcoma of the choroid, even when highly pigmented, is usually more cellular than was this tumor, and it seems plausible to believe that this growth had its origin in a melanoma, for two reasons: (1) because the amount of pigment was entirely out of proportion to the number of cells, and (2) because with all the marked pigmentation no areas of degeneration were seen even though the mass was poorly vascularized, outside of the central retinal vessels, which, however, gave off no branches to the tumor proper.

FREQUENCY

According to all the available literature, this rare condition has been reported with clinical and pathologic findings only five times. Murray [1] in 1910, Vasquez-Barrier [2] in 1911, Oloff [3] in 1915, Speciale-Cirincione [4] in 1925 and Oguchi [5] in 1933 all reported cases of primary sarcoma of the optic disk without involvement of the choroid.

Many papers have been published on primary tumors of the optic nerve and papilla, among which are those by Salzer,[6] Krauss,[7] Kurzezunge and Pollack,[8] Durst,[9] Huc,[10] Cosmettatos,[11] Hudson [12] and others,

1. Murray, G. D.: A Case of Sarcoma of the Optic Disc, Ophthalmology **7**:11, 1910.

2. Vasquez-Barrier, A.: Bemerkenswerter Fall von Melanosarkom der Papille, Klin. Monatsbl. f. Augenh. **49**:43 and 73, 1911.

3. Oloff, H.: Ueber primäre Tumoren und tumorähnliche Bildungen der Papille Nervi optici, Klin. Monatsbl. f. Augenh. **55**:313, 1915.

4. Speciale-Cirincione: Sul sarcoma del disco, Ann. di ottal. e clin. ocul. **7**:850, 1925.

5. Oguchi, T.: Ueber einen Fall von Melanosarkom der Sehnervenpapille, Arch. f. Ophth. **130**:427, 1933.

6. Salzer, F.: Ueber ein primäres tubulöses Angiosarcom des Sehnerven, Arch. f. Ophth. **38**:33, 1892.

7. Krauss, W.: Ueber einen primären Tumor der Optikuspapille, Ztschr. f. Augenh. **27**:142, 1912.

8. Kurzezunge, D., and Pollack, P.: Ein Fall von primärer Neubildung auf der Papille des Opticus, Ztschr. f. Augenh. **10**:302, 1903.

9. Durst, A.: Ueber Geschwülste und Geschwulstähnliche Gebilde der Papilla Nervi optici, Inaug. Dissert., Berlin, Leipzig, R. Norske, 1909.

10. Huc, E.: Tumeurs du nerf optique, Thèse de Paris, no. 162, 1882.

11. Cosmettatos, G. F.: Sarcome primitif du nerf optique, Rev. gén. opht. **37**:5, 1923.

12. Hudson, A. C.: Primary Tumors of the Optic Nerve, Roy. London Ophth. Hosp. Rep. **18**:317, 1912.

but none of these deals with primary melanosarcoma of the nerve or papilla. Most of the cases reported were instances of neurofibroma or myxosarcoma, and a few were cases of perithelioma and angiosarcoma. In Abelsdorf's [13] volumes on the pathology and anatomy of the eye the only references are to the cases reported by Oloff, Speciale-Cirincione and Vasquez-Barrier. Durst quoted Silex as stating that of 70,000 patients seen at the Polyklinik none had a true neoplasm of the optic papilla; he also expressed the belief that myxosarcoma is the most common form of tumor of the optic nerve. Huc, according to his thesis on tumors of the optic nerve, apparently felt so strongly that this was the case that he discussed only myxosarcoma of the optic nerve. Oguchi stated in his paper that his was only the fourth case of melanosarcoma of the disk in which a pathologic examination had been made and the result published; apparently he felt that Oloff's case was incomplete and should not be included.

Murray's case was that of a man 66 years old who had a mass entirely obscuring the optic disk of the right eye. After the enucleation the mass measured 8 by 9 mm. Histologically the sarcoma was of the spindle cell type, was limited by the retina and sclera and did not invade either. There were some pigmented cells in the anterior portion, but none posteriorly in the nerve proper.

Vasquez-Barrier's patient was a man of 32 with marked diminution of vision in one eye and a dark pigmented tumor protruding from the papilla into the vitreous on all sides. The tumor extended posteriorly into the nerve behind the lamina cribrosa as much as it did anteriorly into the vitreous, and it was difficult to decide whether the tumor had originated in the papilla or behind it. However, because the anterior portion had younger tumor cells and more vessels, while the posterior portion had fewer vessels and some areas of degeneration, Vasquez-Barrier felt that the tumor had had its origin in the extra-ocular portion of the nerve and had then grown into the papilla.

Durst pointed out that sarcoma of the retrobulbar portion of the optic nerve seldom invades the papilla through the lamina cribrosa, but more often extends backward along the nerve stem. Oloff also felt that a tumor arising in the retrobulbar portion of the optic nerve grows toward the brain and not forward to the papilla through the lamina cribrosa. Thus, Oloff and Durst are directly opposed to Vasquez-Barrier and probably correctly so. Oloff's case could not be studied completely because of the mobilization at that time in Germany for the World War, but it was definitely determined that the tumor was a pure sarcoma of the papilla which did not invade the optic nerve beyond the lamina cribrosa.

13. Abelsdorf, G., in Henke F., and Lubarsch, O.: Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin, Julius Springer, 1928, vol. 2, pt. 1.

Speciale-Cirincione reported a case in 1925 in which there was little pigment and the tumor extended into the vitreous and also somewhat behind the lamina cribrosa. In 1933 Oguchi reported a case of melanosarcoma of the optic disk in which the cells were of the mixed type. The tumor had no connection with the choroid and "extended somewhat into the optic nerve."

RELATION OF MELANOMA OF THE DISK TO MELANOSARCOMA

Papers by Kraupa,[14] Scheerer [15] and Spencer,[16] and the discussion of Spencer's paper by Collins and Mann throw some light on an interesting subject. Spencer stated that melanoblasts are of epiblastic origin, while melanophores are of mesoblastic origin, and that the latter do not form melanin as long as no malignant changes have occurred. Melanogen is the other substance which on oxidation becomes melanin. Bruno Bloch showed that dopa (a short name for di-hydroxyphenylalanine) will indicate the presence of melanogen in the cells of sections cut by a freezing microtome. Normally melanogen is found in the cells of the basal layer of the epidermis, the epithelial cells of the hair follicles and the dendritic cells of Langerhans lying between the epidermal cells.

There are two types of pigmented cells in the eye: (1) the retinal pigment epithelium cells, which are visible in the human embryo between the fifth and the seventh weeks, and (2) the choroidal melanophores, or chromatophores, which are seen in the fifth month, according to Bach and Seefelder, or in the seventh month, according to Schieck (as quoted by Scheerer). The choroidal chromatophores grow into the optic nerve with the lamina cribrosa as it spreads into the nerve. In the embryonic eye dopa stains only the retinal pigment epithelium cells and not the choroidal pigment cells or chromatophores, since the latter cells contain melanin but no melanogen. Later, when the retina is fully developed, dopa does not stain even the retinal pigment epithelium cells, which shows that they then contain melanin and no more melanogen and that the melanin once formed does not change.

In benign melanomas of the choroid only the pigmented epithelial cells are stained by dopa. When a melanoma of the choroid becomes malignant, however, there is an increase in the melanotic pigmentation and in melanogen, as shown by a wider reaction to dopa, karyokinesis

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14. Kraupa, E.: Studien über die Melanosis der Augapfels, Arch. f. Augenh. **82**:67, 1917.

15. Scheerer, R.: Pigmentzellenbefunde im Sehnerven, Klin. Monatsbl. f. Augenh. **69**:583, 1922.

16. Spencer, W. G.: Discussion on Intra- and Extra-Ocular Melanomata, Tr. Ophth. Soc. U. Kingdom **46**:74, 1926.

and the development of an inflammatory zone around the pigmented cells. According to Spencer, it seems that a malignant pigmented tumor of the choroid arises from a benign melanoma and not from the chromatophores (or melanophores) of the choroid. However, it is well to remember that many observers believe that cells derived from either epiblastic or mesoblastic tissue may produce melanin, as emphasized by Collins and Mann. According to their belief, a malignant growth may arise from the chromatophores in the choroid and optic nerve, and this is a melanosarcoma, while a growth which arises from the epithelial cells of a melanoma should be called a melanocarcinoma.

Areas of pigmentation about the disk and in the nerve proper are not uncommon and it is likely that benign melanoma may be situated in the optic nerve. In Oguchi's paper emphasis was placed on the frequency of pigmentation of the optic nerve in the Japanese, and it is generally recognized that this condition is fairly common in the Latin race also. Kraupa, Scheerer, Reese and others have remarked the frequency of the occurrence of pigmented cells in the optic nerve. According to one school of thought, malignant changes may occur whether these cells are chromatophores or the pigmented epithelial cells of a melanoma, while another group contends that only if these pigmented cells constitute a melanoma can a malignant growth arise.

UVEITIS WITH ASSOCIATED ALOPECIA, POLIOSIS, VITILIGO AND DEAFNESS

REPORT OF A CASE

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The literature contains reports of twenty-one cases of this form of uveitis. Koyanagi,[1] in 1929, reviewed statistically the ten previously reported cases and added six observed by himself. His review included the first case to be reported, that by Vogt [2] in 1906, and subsequent cases reported by K. Komoto,[3] J. Komoto,[4] Maseda,[5] Tsugi,[6] Hata and Herada [7] and Arisoida.[8] Since 1929 further contributions have been made by Gilbert,[9] Parker [10] and Rones.[11]

There is a marked similarity between this disease and sympathetic ophthalmia, both in the ocular findings and in the associated complications. Vitiligo, alopecia, deafness and poliosis have been reported as occurring in association with sympathtic ophthalmia, although rarely. The clinical picture of this form of uveitis is that of a severe bilateral sympathetic ophthalmia.

ETIOLOGY

As in many other clinical conditions, syphilis has been suggested as the cause for the disease without sufficient clinical investigation. At this time I believe syphilis can be ruled out definitely in that the reported

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From the Department of Ophthalmology of the University of Michigan Medical School.

1. Koyanagi, Y.: Dysakusis, Alopecia und Poliosis bei schwerer Uveitis nicht traumatischen Ursprungs, Klin. Monatsbl. f. Augenh. **82**:194 (March 1) 1929.

2. Vogt, A.: Frühzeitiges Ergrauen der Zilien und Bemerkungen über den sogenannten plötzlichen Eintritt dieser Veränderung, Klin. Monatsbl. f. Augenh. **45**:228, 1906.

3. Komoto, K.: Chuo Ganka Iho **11**:113, 1911; **12**:1, 1920; cited by Koyanagi.[1]

4. Komoto, J.: Klin. Monatsbl. f. Augenh. **49**:139, 1911; **50**:129, 1912; cited by Koyanagi.[1]

5. Maseda: Jikken Gauka Zasshi **9**:431, 1926; cited by Koyanagi.[1]

6. Tsugi: Nippon Gauka Zasshi **22**:359, 1918; cited by Koyanagi.[1]

7. Hata and Herada: Jikken Gauka Zasshi **2**:199, 1918; cited by Koyanagi.[1]

8. Arisoida: Jippon Gauka Zasshi **23**:23, 1919: cited by Koyanagi.[1]

9. Gilbert, V.: Vitiligo and the Eye, Klin. Monatsbl. f. Augenh. **48**:24, 1910.

10. Parker, Walter: Uveitis Associated with Alopecia, Poliosis, Vitiligo and Deafness, Am. J. Ophth. **14**:577 (July) 1931.

11. Rones, Benjamin: Uveitis with Dysacousia, Alopecia and Poliosis, Arch. Ophth. **7**:847 (June) 1932.

Wassermann and Kahn blood tests for syphilis have been negative in most instances. Tsugi [6] and Maseda,[5] however, reported improvement in eyes treated with injections of arsphenamine in cases in which the blood test for syphilis was negative. This same form of treatment has been utilized in sympathetic ophthalmia with some success.

Demaria [12] stated that the tuberculin and Wassermann tests, if investigated, would definitely establish the etiology. In three cases reported by Rones,[11] two reported by Parker [10] and the one presented here the tuberculin test was found to be negative.

Peters [13] submitted the theory that anaphylactic toxins formed through the antigenic effect of degenerated uveal pigment involved other pigmented structures especially the labyrinth. Koyanagi [1] disagreed with this explanation, noting that there is little pigment in the labyrinth of man and that its physiologic action is unknown. He noted further that complaints of defective hearing occur early in the cycle of the syndrome, when the uveal pigment cannot have exerted its antigenic qualities.

Calagero [14] stated that the complaints of defective hearing could be explained on the basis of an irritation of a definite band of sympathetic fibers which he said existed directly between the eye and the ear.

Elschnig [15] suggested that alopecia and poliosis in association with sympathetic ophthalmia result from the antigenic effect of the uveal pigment, the hair being involved because of the marked amount of pigment present. He held that the uveal pigment can form antibodies, and stated that he had proved this experimentally. Other authors have stated that they had disproved this theory.

The etiology of vitiligo is unknown. An attempt has been made to explain its occurrence on the basis of an antigenic effect of uveal pigment. Gilbert [9] stated that vitiligo is often associated with herpes zoster. It has been confirmed that the herpes virus is a dermoneurotrope causing an intra-ocular inflammation similar to sympathetic ophthalmia.

It has been suggested that the complications of this disease are coincidental. Koyanagi,[1] however, has been of the opinion that the complications are based on the same cause, and that such findings are not merely coincidental. He stated that a definite explanation has not as yet been made, and that the anaphylactic toxin effect, even in sympathetic ophthalmia, must be regarded skeptically.

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12. Demaria, E. B.: Semana méd. **23**:379 (Oct. 19) 1916.

13. Peters, A.: Die Diagnose und Therapie der sympathischen Augenentzündung, Deutsche med. Wchnschr. **38**:1361, 1912.

14. Calagero, G.: Relationship Between Complicating Deafness and Original Eye Disease, Arch. di ottal. **33**:499, 1926.

15. Elschnig, A.: Studien zur sympathischen Ophthalmie: Die Antigene Wirkung des Augenpigmentes, Arch. f. Ophth. **76**:509, 1910.

CLINICAL COURSE

On reviewing the literature it is found that 64 per cent of the cases reported occurred in males and 36 per cent in females. One male was of the Negro race. The youngest subject was 10; the oldest, 47; the average age was 31. Fifty-five per cent complained of prodromal symptoms, usually consisting of headaches, drowsiness, nausea and a feeling of heaviness about the head. In the case reported by Maseda [5] the headache was so severe that a tumor of the brain was suspected. The uveitis, which is always bilateral, develops rapidly, reaching its height in a few days. Usually there are marked circumcorneal injection, clouding of the cornea, edema of the iris with the development of keratitic precipitates, posterior synechia and pupillary membrane. Definite depigmentation of the fundus was noted in three cases. Neuroretinitis and retinal detachment have been recorded, but statistical studies of these intra-ocular findings are of questionable value owing to the difficulty of examining the fundus, the pathologic changes hindering such observations. Forty-six per cent presented hypotension and 10 per cent hypertension of the globe. During the acute phase the vision diminished to the perception of moving objects or less, with 27 per cent having a recovery of vision to 5/10 or better.

Alopecia and poliosis occurred in all the reported cases; their earliest appearance was at three weeks; their latest, at nine months, with an average appearance at from one and one-half to three months after the onset of the uveitis. The alopecia involved chiefly the hair of the head, rarely the eyebrows or lashes, and was usually patchy. Associated with the alopecia there was poliosis of the hair of the head, eyebrows and lashes. Koyanagi [1] does not believe that there is a sudden whitening of the hair but that there is an inhibition of pigment formation at the hair bases. In the areas of alopecia there develop new, sharp, pigmentless hairs. For this reason the poliosis is often not noted until the hairs are well grown out. If the hair is examined meticulously at the onset or shortly after the onset of the uveitis, a poliosis may probably be noted at the bases of the hair early in the course of the disease. In 42 per cent of the recorded cases there was a definite recurrence of normal black hair, the poliosis being almost entirely supplanted in a few instances.

Tinnitus with difficulty in hearing occurred in 54 per cent of the cases. This usually appeared early in the course of the disease, was often quite severe and was transient.

Vitiligo was noted in 54 per cent of the cases, occurring shortly after the onset of the alopecia and poliosis and usually involving the neck, shoulders, eyelids and backs of the hands.

The blood test for syphilis was negative in 87 per cent of the cases; in six reports there is no record of such a test having been made. In

five instances the tuberculin test was carried out, with negative results. Rones [11] used the uveal pigment test in all three of his cases, obtaining a positive result in one instance. He does not believe that this disproves Peters' theory since in all instances the disease was beyond the acute phase.

TREATMENT

Locally, the treatment is identical with that used in the ordinary case of uveitis, the physician doing all that is possible to keep the pupil

Patient who had uveitis with associated alopecia, poliosis and deafness.

well dilated. An attempt should be made to locate and eliminate any existing focus of infection. There should be an attempt to establish the etiology.

REPORT OF A CASE

L. L., aged 31, began to have headaches over his right eye on March 5, 1932. Three weeks later severe iritis developed in both eyes, the process appearing in the left eye first. Vision was soon reduced to the point of being able only to count fingers. Early in April of the same year the patient began to experience marked deafness and was lethargic at times. Two months following the onset his general health began to improve steadily, with hearing returning to normal and the iritis

in both eyes quieting. Six weeks following the onset of the acute iritis alopecia developed in patchy areas about the head with poliosis of the hair of the head, brows and lashes. Six months later the eyes were quiet with no subjective symptoms.

The past history revealed that the patient had rheumatism when younger. There was a history of measles, mumps and whooping cough. The patient smoked an average of five cigars a day and drank considerable home brew.

He was seen in the department of ophthalmology of the University of Michigan Medical School on Jan. 8, 1934. At that time the hair of the head was made up of white and black hair of about equal distribution. The eyebrows were completely white. The cilia were practically white with a few black hairs present. The eyes showed moderate conjunctival hyperemia with slight circumcorneal injection. The cornea was roughened, with vascularization above and below. Keratitic precipitates were present. The iris was atrophic, with complete posterior synechia. The pupil was inactive, with a small pupillary membrane present. A very faint fundus reflex was obtained. No details of the fundus could be made out. Vision was only perception of light in both eyes.

The blood revealed a negative Kahn reaction for syphilis, a hemoglobin content of 102 per cent, 4,620,000 red cells per cubic millimeter, 8,150 white cells per cubic millimeter and on differential count 75 per cent polymorphonuclear leukocytes, 20 per cent lymphocytes, 3 per cent monocytes, 1 per cent transitional and 1 per cent eosinophilic cells. The calcium content was 15 mg. per hundred cubic centimeters. The blood culture and roentgenograms of the chest and skull showed nothing of importance. The tuberculin test was negative. The patient disclosed poor oral hygiene and had septic tonsils, vasomotor rhinitis, nasal polypi, hyperplastic sinusitis and constipation. There was no evidence of vitiligo.

The diagnosis was uveitis with alopecia, poliosis and deafness.

No treatment was advised since the eyes were quiet and the patient was perfectly comfortable.

SUMMARY

The report concerns a case of bilateral uveitis with associated alopecia, poliosis and deafness.

The clinical findings and various theories of etiology are reviewed.

The similarity of this disease to sympathetic ophthalmia both in ocular findings and complications is mentioned.

Treatment was the same as that in the usual case of uveitis.

EFFECT OF EXTRACT FROM CATARACTOUS HUMAN LENSES ON SENILE CATARACT

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The nonoperative treatment of cataract has long been attempted by various therapeutic means. Since the advent of the study of immunity numerous attempts have been made to immunize the eye against the formation of cataract and to clear up existing opacities of the lens by stimulating the formation of antibodies. The results have not been encouraging. The first attempt to produce immune bodies in the treatment of cataract was made by Römer [1] in 1908. Davis [2] and a few others have reported as high as 85 per cent of incipient subcapsular senile cataracts and a slightly lower percentage of senile cortical cataracts improved, arrested or retarded following the production of an active immunity by subcutaneous injections of an extract of beef lenses.

The development and progress of senile cataract are variable. In some cases the condition progresses to full maturity in several months while in others (the majority of cases) it may require several years to reach this stage. In other cases, again, it comes to a spontaneous arrest after reaching a certain stage of development. The interpretation of the therapeutic effect of medication must therefore be weighed carefully in order to avoid error. Not all visible opacities of the lens are made up of permanently changed, that is, coagulated, lens protein; some are constituted of partly disintegrated lens fibers, others of separated lamellae and vacuoles filled with water which appear opaque because of the difference in their refractive power as compared with that of the normal lens fibers (comparable to the classic experiment in which transparent water shaken in a test tube gives an opaque fluid as a result of the mixing of the transparent water with equally transparent air). It is therefore evident that changes in the location and appearance of the opacities may be noted from time to time, and with this there may be changes in the visual acuity from week to week or month to month. A change in the visual acuity cannot, therefore, be accepted as a criterion of improvement or of progression of the cataract. Only careful study

From the Department of Ophthalmology, Rush Medical College, University of Chicago.

1. Römer, P.: Specifische Therapie des beginnenden Altersstares, Ber. ü. d. Versamml. d. deutsch. ophth. Gesellsch. **35**:195, 1908.

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by means of the slit lamp over a long period of time can give an accurate idea of the changes taking place in the lens.

Lens proteins, being organ-specific, differ from other tissue proteins and can act as foreign proteins. For that reason protein extracts of the lenses of cattle, pigs, horses or other vertebrates should produce antibodies in the form of precipitins or complement-fixing bodies in all other veretbrates. Hektoen and Schulhof,[3] however, found that homologous lens extracts do not produce such immune bodies in rabbits unless these animals are first immunized against heterologous lens proteins such as beef or pig lens proteins. That precipitins can, at times, be produced in the blood of man by subcutaneous injections of beef lens extract is shown by the work of Kirby and Giles,[4] who found three positive reactions in twenty-two patients given injections of a commercial beef lens extract. Verhoeff and Lemoine[5] based their theory of the production of the so-called endophthalmitis phako-anaphylactica which is said to develop sometimes after extraction of a cataract if some of the lens cortex is left in the eye on the supposition that the patient is sensitive to his own lens protein. The existence of such a phako-anaphylactic inflammation has been denied by competent observers.

Burky[6] and Woods found positive allergic cutaneous reactions in 17 per cent of eighty-six cataractous patients tested with lens proteins. The majority of the patients manifested postoperative reactions of varying severity. Burky, Woods and Woodhall[7] found that homologous alpha crystallin is a true organ-specific substance and produces antibodies specific for alpha crystallin from all species while beta and gamma crystallin are inert in the homologous series, and when combined with alpha crystallin in whole lens extract inhibit the antigenic properties of the latter.

As previously stated, opacities of the lens may be due to actual coagulation of lens proteins, to accumulation of fluid between separated lens fibers or to imbibition of fluid by lens fibers, that is, to a precipitation of the lens protein. Coagulation is a complex chemical change in

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the composition of the protein molecule. Its mechanism is as yet unknown, but the process is irreversible. Coagulated lens fibers are dead lens fibers. Precipitation, on the other hand, is a reversible process in which there is no chemical change in the protein molecule. Since in some of the changes taking place in the formation of cataract the nature of the protein molecule is changed it was thought that the discouraging results reported with heterologous lens protein therapy by various investigators might be due to the fact that the antibodies formed after treatment with extracts obtained from noncataractous lenses of cattle and other animals react against the remaining clear lens substance rather than against the opaque proteins and thus favor rather than retard the formation of cataract. A more logical procedure, then, would be to try to obtain extracts from cataractous lenses. Senile cataractous human lenses should lend themselves best for that purpose because it is just these changes that one wishes to avoid. The fact that homologous lens extracts do not produce antibodies in animals does not necessarily mark the procedure as unpractical, since the normal proteins of the lens undergo chemical changes in the process of cataract formation and these new protein combinations may react differently from those of the clear lens.

PREPARATION OF LENS EXTRACT

Ten senile cataractous lenses extracted by the extracapsular and the intracapsular method were ground up in 2 per cent sodium chloride and centrifugated. The supernatant fluid was poured off, and ammonium sulphate crystals were added to it, while it was being shaken, until it was supersaturated. This gave the total lens proteins. (To obtain the globulins, ammonium sulphate crystals are added to only half saturation. This leaves the albumin in suspension. The latter can then be precipitated by saturating the solution with ammonium sulphate.) After the solution had stood in a refrigerator over night it was again centrifugated until the precipitate settled to the bottom of the tube. The supernatant fluid was decanted and just enough physiologic solution of sodium chloride was added to dissolve the precipitate. This solution was then placed in a sausage casing and dialyzed, first against tap water, later against physiologic solution of sodium chloride until free from ammonium sulphate as determined with Nessler's reagent. A sample was cultured as a test for sterility; 3 cc. of 1:1,000 merthiolate was added as a preservative and the solution made up to 30 cc. with physiologic solution of sodium chloride.

RESULTS OF TREATMENT

Of twenty or more patients with senile cataract, five with bilateral incipient progressive senile cortical opacities were selected as suitable because their general physical condition was good, their corrected visual acuity, with the exception of that in one eye, was 0.3 or better, and careful examination with the slit lamp showed, in addition to dense opaque coagulated cortical substance, vacuoles and lamellar separations in the anterior cortex, indicating a progressive character of the opacities.

Sketches of the lens opacities were made for future comparison. After an initial subcutaneous injection of 0.25 cc. of lens extract, 0.6 cc. and then 0.8 cc. of lens extract was administered subcutaneously twice a week for three months.

CASE 1.—On July 18, 1933, Mrs. S. McG., aged 63, had corrected vision of 6/200 with the right eye and of 0.6 with the left. A first injection of lens protein was made on this date. On August 3, vision was as follows: right eye, 0.2; left eye, 0.5. On September 9, vision was: right eye, 0.2; left eye, 0.5. Four months after the beginning of treatment the right lens was completely opaque; the left lens showed no changes. The visual acuity was: right eye, perception of light; left eye, 0.5.

CASE 2.—Mrs. M. S., aged 63, had corrected vision of 0.5 with each eye. Treatment was begun on Nov. 11, 1933. Two months later the visual acuity had improved to 0.8 with each eye. Fifteen months later vision was 0.6 with the right and 0.8 with the left eye. The slit lamp showed, in addition to the old opacities, vacuoles and lamellar separation, indicating an active progression of the cataract in spite of the improvement in vision.

CASE 3.—Mrs. A. J., aged 74, had corrected vision of 0.3 with each eye. Treatment was begun on July 18, 1933. Four weeks after the first treatment vision in the right eye was 0.5, and that in the left was 0.4. Three months later vision in each eye was 0.4. The slit lamp showed no change in the cataracts. Eighteen months later vision was 0.3 with each eye.

CASE 4.—Mrs. C. S., aged 66, showed vision of the right eye equal to 0.5, and that of the left eye equal to 0.3. Treatment was started on Nov. 16, 1933. Three months later vision in the right eye was 0.5; that in the left, 0.2. Fifteen months later vision in the right eye was 0.3; that in the left was equal to counting fingers at 1 foot (30.48 cm.). The slit lamp showed, in the right eye, progressive cataract and in the left eye cortical opacities combined with nuclear sclerosis of such density that the fundus reflex could not be obtained.

CASE 5.—Mrs. H. H., aged 66, had corrected vision of 0.5 in the right eye and of 0.4 in the left. Treatment was begun on Nov. 20, 1933. Three months later vision in the right eye was 0.8, and that in the left was 0.6. Four months after the last treatment vision in the right eye was 0.5; that in the left was 0.4. The slit lamp findings were unchanged.

In case 1 the patient had an initial improvement in visual acuity from 6/200 to 0.2 in the left eye, but four months after the beginning of the treatment vision in this eye was reduced to perception of light. In case 4 there occurred a similar early improvement in visual acuity. Examination fifteen months later, however, showed a marked decrease of vision in one eye. The patient in case 5 had no change in her visual acuity after four months, and the patient in case 3 maintained her original visual acuity for eighteen months. The patient in case 2 was the only one whose vision remained improved after fifteen months, although the slit lamp revealed that the cataracts were still progressing.

The results with this form of treatment, therefore, are disappointing.

SUMMARY AND CONCLUSIONS

The literature shows many conflicting reports as to the value of lens protein therapy in the medical treatment of senile cataract. Many factors influence the progress of lens opacities, and the rate of development of senile cataract varies in different patients and even in the two eyes of the same patient. The use of extracts from noncataractous beef lenses should favor, instead of retard, the development of lens opacities. Extracts from cataractous human lenses seem to have no effect on the progress of senile cataract.

INTRACAPSULAR CATARACT EXTRACTION BY THE KNAPP METHOD AS COMPARED WITH THE CLASSIC PROCEDURE

A FURTHER REPORT

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With a desire to supplement my previous report [1] of 100 cases of intracapsular extraction of senile cataract by the Knapp method, and to evaluate the advantages of this method in comparison with the older classic procedure, I now report the results in a series of 300 cases at my clinic in Wills Hospital, taken in sequence up to approximately the present time.

Of the 300 patients, 175 were operated on by me, and 125 were operated on by my assistant or by the chief resident under my direction. An attempt at delivery by the intracapsular method was made in all cases; its was successful in 100, or 57.14 per cent, of my personal series of 175 cases and in 26, or 20.8 per cent, of the 125 cases in which my assistants operated.

My percentage is slightly higher in this than in the previous series, in which the intracapsular operation was successfully done in 55.55 per cent of the cases.

Extraction in the capsule failed either because I was unable to grasp the capsule with the Kalt forceps or, when grasped, the capsule tore. The fact that the anterior capsule tears is in no way detrimental, as the case is simply converted into one necessitating delivery by the usual expression method, followed by flushing any remaining cortical débris from the eye by an irrigating cannula. For the latter purpose I prefer a cannula using hydrostatic pressure.

TECHNIC

The patient's pupil is dilated by one or two drops of a 1 per cent atropine solution one hour before operation. The facial nerve is blocked preceding the operation.

Section is made through the limbus, with a very small conjunctival flap. I dislike a large flap for two reasons: first, it is accompanied usually by abundant and troublesome hemorrhage; second, if a large flap is turned down over the

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1. Appleman, Leighton F.: Intracapsular Cataract Extractions by the Knapp Method: A Report on One Hundred Cases, Arch. Ophth. **9**:907 (June) 1933.

cornea, in order to do an iridectomy, it obscures the grasp of the iris and also gets in the way or is mutilated in the course of the iridectomy and therefore fails in its purpose.

Hemorrhage is not usually troublesome. If it occurs, it is at once irrigated out of the anterior chamber in order to produce a clear view of the lens and iris.

After an iridectomy, the Kalt forceps is used to grasp the anterior capsule as low down in the lower third as possible; then, by a gradual to and fro traction with a slight upward lift, the zonule is broken below and the lens drawn upward until the lower edge is seen almost in the pupillary space, when the grasp of the forceps is released. A spoon is then taken in each hand; the lower one is placed on the cornea below the lens, which it follows upward as it tumbles; the second spoon, in the left hand, gently depresses the scleral edge of the wound, allowing delivery without undue delay.

The iris is then replaced and care taken that the conjunctival flap is in position, after which a drop of atropine solution is instilled and the eye closed. This dressing is not disturbed for forty-eight hours.

This method of tumbling the lens in its delivery gives little chance for the escape of vitreous, as the zonule is not broken above until the lens is outside the globe. If the spoon in the right hand follows the lens closely in tumbling, there is little chance of the vitreous escaping between the lens and the cornea.

VISUAL RESULTS

In analyzing the visual results, the cases in which the intracapsular extraction was done successfully will be considered first. In the 100 patients on whom I operated vision was obtained as follows: 6/6 in 38, or 38 per cent; 6/9 in 33, or 33 per cent; 6/12 in 6, or 6 per cent; 6/15 in 2, or 2 per cent; 6/21 in 7, or 7 per cent, and 6/30 in 3, or 3 per cent. Vision of less than 6/30 was obtained in 11, usually in those advanced in years, with macular or choroidal changes accounting for the difficulty in 4, choroidal detachment in 2, injury during convalescence in 1 and optic nerve atrophy in 1. Three others did not report back; these came from a distance and probably found it impossible to do so.

Stated in another way, there were 77 patients in whom vision of 6/12 or better was obtained; that is, 77 per cent. This result exceeds that reported in my series of 1932, in which 67.02 per cent of the patients obtained vision of 6/12 or better.

The 26 successful intracapsular extractions among the 125 operations done by my assistants gave visual results as follows: 6/6 in 7, or 26.92 per cent; 6/9 in 4, or 15.38 per cent; 6/12 in 4, or 15.38 per cent; 6/15 in 2, or 7.69 per cent; 6/21 in 2, or 7.69 per cent; and 6/30 in 1, or 3.84 per cent. Vision of less than 6/30 was obtained in 6 patients, of whom 1 had retinal detachment, 1 chronic glaucoma and 1 senile macular changes. Three did not report.

In this group, 15 patients obtained vision of 6/12 or better; that is, 57.69 per cent.

VISUAL RESULTS IN EXTRACTION BY THE CLASSIC METHOD

This type of extraction was done in 75 of my 175 personal cases and in 99 of 125 cases in which my assistants operated.

In the 75 personal cases, the visual results obtained were as follows: 6/6 in 23, or 30.66 per cent; 6/9 in 20, or 26.66 per cent; 6/12 in 5, or 6.6 per cent; 6/15 in 3, or 4 per cent; 6/21 in 10, or 13.33 per cent, and 6/30 in 2, or 2.66 per cent. Vision of less than 6/30 was obtained in 12, or 16 per cent. In these cases the complicating conditions included cloudy cornea in 2, glaucoma in 1, diabetic changes in the retina in 1, degenerative changes in the retina in 6. One patient did not return for examination.

In this group, vision of 6/12 or better was obtained in 48, or 64 per cent.

In the 99 cases in which the classic method was followed by my assistants vision was obtained as follows: 6/6 in 28, or 28.38 per cent; 6/9 in 23, or 23.23 per cent; 6/12 in 12, or 12.12 per cent; 6/15 in 8, or 7.97 per cent; 6/21 in 4, or 4.04 per cent, and 6/30 in 4, or 4.04 per cent. Vision of less than 6/30 was obtained in 20 cases, in which the complicating conditions included retinal changes associated with arteriosclerosis or macular disturbance in 10, myopic choroiditis in 1, secondary infection in 1 and chronic glaucoma in 1. No report was obtained in 7.

In this group, vision of 6/12 or better was obtained in 63, or 63.63 per cent.

If one combines the two series as to visual results, one finds that 77 of the 100 cases in which I performed the intracapsular extraction successfully added to 15 of the 26 cases in which my assistants performed this operation successfully give a total of 92 of a total of 126 successful cases in which vision of 6/12 or better was obtained, that is, 73.01 per cent.

In the group in which extraction was accomplished by classic expression 48 of 75 of my personal cases, if added to 63 of my assistants' 99 cases, give a total of 111 cases out of a total of 174 in which vision of 6/12 or better was obtained, that is, 63.79 per cent.

DURATION OF STAY IN THE HOSPITAL AFTER OPERATION

In the cases in which I operated the average number of days spent in the hospital after operation was 11.5 days in the cases in which the intracapsular extraction was done, and 14.15 days in those in which the classic operation was followed.

In the cases in which my assistants operated, the duration of hospitalization in the cases in which the intracapsular operation was done

was nearly the same as in my own series, namely, 11.74 days; and in cases in which extraction was not done by the intracapsular method it was 12.4 days.

RECOVERY

Recovery after operation is wonderfully smooth and uneventful in the majority of cases. So little reaction is sometimes seen that one would scarcely believe an operation had been done.

In such cases the eye not operated on may be uncovered by the third or fourth days, the eye operated on, the day following, and the patient allowed up on the next day.

Considering that these statistics include a group of patients afflicted with the infirmities of age and debility who are bad surgical risks, I may say that I am enthusiastic as to the results.

In the older type of operation by expression, I think there is no doubt that the retention of lens débris in the capsular remains, with more or less blood, a frequent happening, accounts for the severe reactions frequently seen after operation. Then, also, a secondary operation of capsulotomy is often imperative if good sight is to be obtained, with the danger of a disastrous reaction again occurring.

The intracapsular method does away with all of this, and I believe should be generally adopted.

RECAPITULATION

Summarizing these results in my personal cases, one finds that the visual results were better in those in which extraction was done by the intracapsular method (77 per cent of the patients obtained vision of 6/12 or better) than in those in which extraction was done by the older method (vision of 6/12 or better in 64 per cent), a difference of 13 per cent in favor of the intracapsular method.

If one combines the statistics in all cases in which extraction was done under my observation, the results show a difference of nearly 10 per cent in favor of the intracapsular method.

CONCLUSIONS

1. The intracapsular method gives a remarkably smooth and rapid recovery, with scarcely any reaction.

2. The patient requires but one operation.

3. The stay in the hospital is shorter.

4. The visual results are better.

5. It is, in my belief, superior to the older type of operation and therefore should be generally used.

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EFFECT OF EXPERIMENTAL DIABETES ON THE CORNEA OF DOGS

ITS RELATIONSHIP TO THE ADMINISTRATION OF VITAMIN A

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The occurrence of ocular complications in patients with diabetes mellitus has been reported frequently,[1] the one most commonly observed being cataract.[2] Recently Chaikoff and Lachman [3] reported the occurrence of cataract in depancreatized dogs. The animals observed were diabetic for periods of from one year to two years and eight months. The observations suggest that the duration of the diabetes is a factor in the development of cataract, as the dogs that were diabetic for only one year had normal lenses. No other ocular changes were mentioned in the paper. Van Noorden and Isaac,[4] in discussing changes in the eyes in diabetic patients, concluded that the changes affected those tissues that were nourished osmotically. They made no mention of the cornea, although if their premise is correct the vitreous and cornea should be included in the tissues liable to such changes. The only reference, to our knowledge, of corneal changes in diabetic persons was by Gallus,[5] who reported diffuse corneal infiltration occurring in two diabetic patients. This was not, however, ascribed to any particular layer. Clinically, the condition apparently resembled keratomalacia in certain respects.

Corneal changes, among other ocular lesions in avitaminosis A, have been produced experimentally and are considered now as a disease

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TABLE 1.—*Summary of Diet and Observation on the Eyes of Normal Dogs and Dogs with Ligated Pancreatic Ducts*

Dog	Diet, Gm.*	Number of Days on Diet	Blood Cholesterol, Mg. %			Analysis of Liver for Vitamin A and Carotene		Observations on Eyes
			Average	Upper Limit	Lower Limit	Blue Units, per 100 Gm.	Yellow Units, per 100 Gm.	
Normal								
73	Cracker meal 150 Meat 150 Whole milk 100 Lard 15	33	145	167	131	7,700	70	No pathologic changes
89	Meat 150 Cracker meal 100 Sugar 30 Yeast 5 Lecithin 10	128	225	258	191	1,540	80	No pathologic changes
110	Meat 150 Cracker meal 100 Sugar 30 Skimmed milk powder 30 Yeast 5	134	204	256	134	440	200	No pathologic changes
113	Liver 200 Cracker meal 100 Skimmed milk powder 30 Sugar 30 Yeast 5	73	223	303	192	814,000	180	No pathologic changes
Pancreatic ducts ligated		**Days Ligated**						
114	Meat 150 Cracker meal 100 Sugar 30 Skimmed milk powder 30 Yeast 5	73	235	263	151	None	Too light to read	No pathologic changes
115	Meat 150 Cracker meal 100 Skimmed milk powder 30 Sugar 30 Yeast 5	205	183	232	106	None	120	Epithelium intact; iris normal; edema of some ciliary processes on one side; changes probably due to postmortem changes

* All dogs received bone ash, 4 Gm. and salt mixture, 3 Gm.

TABLE 2.—*Summary of Diet and Laboratory and Ocular Observations on Depancreatized Dogs*

Dog	Diet,* Gm.	No. of Days Diabetic	Average Daily Excretion of Sugar, Gm.	Daily Dose of Insulin, Units	Average Blood Sugar		Average of Blood Cholesterol		Analysis of Liver for Vitamin A		Summary of Eye Findings
					Before Depancreatinization, Mg. %	In Diabetic Period, Mg. %	Before Depancreatinization, Mg. %	After Depancreatinization, Mg. %	Blue Units per 100 Gm.	Yellow Units per 100 Gm.	
70	Raw beef 150 Lecithin 10 Cracker meal 110 Yeast 5	60	30	10-15	82	348	194	202	2,200	200	Keratinization of corneal epithelium, with loss of cell outline and nuclei; swelling of endothelium; swelling of iris, serous iritis
74	Raw beef 150 Pancreas 75 Sugar 30 Cracker meal 100 Yeast 5	62	21	10-15	91	314	170	203	4,950	200	Reduction of superficial layers of corneal epithelium, with keratinization of epithelium; swelling of endothelium
75	Raw beef 150 Lecithin 10 Cracker meal 110 Sugar 30 Yeast 5	116	15	10-25	70	302	173	224	660	200	Epithelium appeared normal; endothelium swollen
78	Raw beef 150 Pancreas 75 Cracker meal 100 Sugar 30 Yeast 10	35	19	10-15	87	329	145	210	1,815	60	Keratinization of outer epithelial layer; loss of cell outline and nuclei
50†	Raw beef 150 Pancreas 75 Sugar 30 Cracker meal 100 Yeast 5	142	24	25-35	83	352	210	333	37,400	70	Keratinization of one side of epithelial layer of cornea extending into conjunctival epithelium; swelling of endothelium
96	Raw beef 150 Lecithin 10 Sugar 30 Cracker meal 50 Skimmed milk 50 Cod liver oil, 20 cc. Yeast 5	56	14	8-20	78	329	200	176	22,000	70	No changes seen
100	Liver 200 Pancreas 75 Sugar 30 Cracker meal 75 Skimmed milk 50 Yeast 5	41	17	8-18	77	313	188	252	44,000	120	No changes seen

* All diets contained bone ash, 4 Gm. and salt mixture, 3 Gm.
† Administration of cod liver oil 20 cc. and lecithin 10 Gm. begun on the thirty-third day after depancreatization.

entity.[6] Clinically and pathologically a haze in the cornea starting limbally and extending throughout is recognized as being due to deficiency of vitamin A. Although these changes have been correlated with other signs of deficiency of vitamin A, as far as we know similar corneal changes have never been reported in depancreatized animals. In this study on dogs rendered diabetic experimentally by depancreatization corneal changes suggestive of avitaminosis A were found. None of the animals suffered from advanced deficiency of vitamin A, so the effects of secondary infection were absent.

EXPERIMENTAL MATERIAL

Four normal dogs and two dogs in whom the pancreatic ducts were ligated were used as controls. The basic diet given all the dogs consisted of raw beef, cracker meal, skimmed milk powder, sugar, vitamins B_1 and B_2 (dried brewers' yeast) and a salt mixture.[7] The amount of food fed this group of dogs is reported in table 1 together with the laboratory observations. One of the four normal dogs (113) received vitamin A in the form of raw liver, and the liver of this dog contained large amounts of the vitamin. The other dogs received no good source of the vitamin, and their livers contained correspondingly less vitamin A. The results in the depancreatized dogs are reported in table 2. Dogs 70, 75 and 96 received lecithin in place of raw pancreas. Three of the dogs (50, 96 and 100) received vitamin A, dog 100, in the form of raw liver, and dogs 50 and 96, in cod liver oil. Dog 50, however, did not receive cod liver oil until she had been diabetic for a period of thirty-three days. We think this is important in view of the character of the changes in the eyes of this dog.

The dogs receiving an adequate amount of vitamin A had large amounts of the vitamin in their livers. These findings are discussed in greater detail in previous papers.[8] The other four dogs had very small amounts of vitamin A in their livers, dog 75 having the lowest amount. The Carr and Price modification of the Rosenheim and Drummond antimony trichloride test[9] was used for the determination of the vitamin A content of the livers, the readings being made in a Lovibond tintometer. Vitamin A is reported in blue units, and carotene in yellow units, per hundred grams of whole liver.

Total cholesterol values for the blood plasma after fasting, estimated by the Bloor method,[10] and values for blood sugar, estimated by the Folin-Wu method,[11] were determined twice a week. The averages before and after depancreatization are reported in table 2, and the average for the nondiabetic dogs in table 1.

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RESULTS

Microscopic examination of the eyes of the normal dogs and of the dogs with the ducts ligated revealed no abnormalities. The eyes of five of the seven depancreatized dogs showed involvement of the cornea. The pathologic change consisted of a superficial haze involving the epithelium (fig. 1) of the cornea. The lesion started close to the limbus as a small patch, gradually enlarging to cover a greater area. Coincidentally there was but slight vascular injection of the episcleral vessels, tearing or discharge. Observations were not made on hemeralopia. Distortion of corneal reflections was found in all the dogs with corneal involvement and pointed to a disturbance of the regularity of the corneal epithelium.

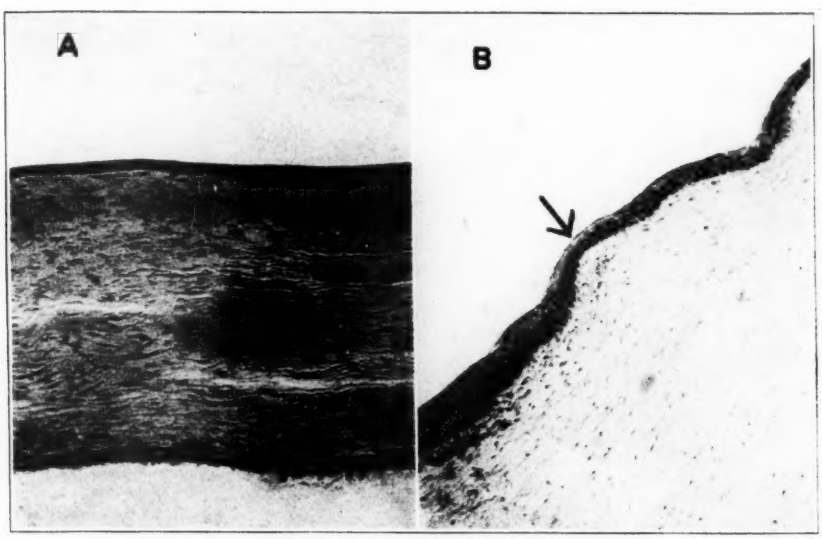

Fig. 1.—Photomicrographs of sections of the cornea showing (*A*) epithelial metaplasia in dog 78 and (*B*) peripheral epithelial metaplasia in the transitional stage in dog 84. Magnification, × 100.

The normal corneal epithelium of the dog (fig. 2) possesses a basal layer of columnar cells followed by three or four layers of cuboidal cells and then several layers of flat superficial cells. The nuclei are clear and definite and the cellular outline can be brought out distinctly. The stroma is laminated, anangiotic and fairly free from wandering cells. The endothelium is low cuboidal and consists of a single line of cells.

In the changes observed in the depancreatized animals in this series the haze noted as pathologic was apparently limited to the epithelium. The basal cell layer was retained, but there was a loss of cell layers beyond this. The flat cell and cuboidal layers showed a shrinkage in

the number of layers and in the size of the cells. The shrinkage was not uniform and was the cause of the surface unevenness. In none of the sections was there any alteration in the basal cell layer. The changes appeared as shrinkage of the cell volume in the superficial layers accompanied by changes in the nuclei which were followed by their destruction and disappearance. These changes indicative of metaplasia into keratinized epithelium were identical with the alterations in many epithelial linings ascribed to avitaminosis A and described clinically as keratomalacia.

The cell outlines were lost, and a homogeneous, structureless matrix resulted. Apparently when this stage was reached fewer replacement cells were produced, which resulted in thinning and compactness of the

Fig. 2.—A photomicrograph of a section of cornea showing normal corneal epithelium. Magnification, × 100.

epithelial layer. The stroma of the cornea showed no change, either as to fixed cells or as to fibers. In the severer cases an increase in the formation of wandering cells was evident. No corneal vascular proliferation was seen in any of the eyes. Swelling and proliferation of endothelium was present in most cases.

No cataractous lenses were found. Hemorrhages and exudates were absent in the choroid, retina and tapetum. In one case serous iritis was found, and in another, edema of the ciliary processes.

DETAILED PATHOLOGIC OBSERVATIONS

Dog 50.—Keratinization was found on one side of the cornea. This extended into the conjunctival epithelium. Swelling of the endothelial layer with proliferation of cells was present.

Fig. 3.—A photomicrograph of the cornea showing peripheral epithelial metaplasia in the transitional stage in dog 84. Magnification, × 450.

Fig. 4.—A photomicrograph of the cornea showing epithelial metaplasia in dog 70. Magnification, × 100.

Dog 70.—The corneal epithelium showed defects in the number of layers, which were irregularly reduced in places. The superficial layers showed loss of cell outline and nuclei. They appeared as a solid layer of deeply staining, homogeneous, structureless substance. The endothelium was swollen in places, with fragmentation of nuclei. There was also proliferation of this layer, especially toward the angle of the anterior chamber. In the anterior chamber was a purplish-staining coagulum. The iris was swollen, the vessels were engorged and a cellular infiltration into the ciliary body on one side was present.

Dog 74.—The superficial layers of the corneal epithelium were reduced in number. The cell nuclei were lost and the cell outlines were blurred. These layers stained a deep blue. The endothelium showed swelling of the cells.

Dog 75.—The epithelial layers were intact and of normal appearance. The endothelial layer was swollen.

Dog 78.—The superficial layers of the corneal epithelium took a very deep blue stain, giving a homogeneous appearance to these parts. The cell nuclei were lost, and the outlines were blurred. The number of layers was much reduced. Other parts were of normal appearance.

Dog 96.—No pathologic changes were seen in the sections examined.

Dog 100.—No pathologic changes could be found in the sections examined.

Dog 115.—This was the dog in which the pancreatic ducts were ligated. At no time was there evidence of a disturbance in carbohydrate metabolism. Microscopic examination of the eyes revealed the epithelium intact throughout. The iris was normal. There was edema of some of the ciliary processes on one side only. In the retina the nerve fiber layer and ganglion cell layers were disorganized, as was the layer of rods and cones.

COMMENT

The eyes of the four normal dogs showed no pathologic changes, regardless of whether the diet contained vitamin A and whether the liver contained a small or a large amount of the vitamin. The eyes of the two dogs with ligated pancreatic ducts showed no keratinization or any change in the epithelium. One of these dogs showed slight edema of the ciliary processes on one side. The other changes were considered mechanical rather than pathologic. Of the seven depancreatized dogs, five showed changes in the corneal epithelium and endothelium and one showed swelling of the endothelium alone. The depancreatized dogs showing these changes had not received any vitamin A, with the exception of dog 50, which received cod liver oil after she had been diabetic for thirty-three days. Of the two dogs, 96 and 100, that were diabetic for fifty-six and forty-one days, respectively, and showed no corneal involvement, both received vitamin A during the entire diabetic period. It might be argued that the period of observation of these dogs was too short, but, on the other hand, dog 78, which was diabetic for only thirty-five days, showed definite pathologic changes, and dogs 70 and 74, which were diabetic for only four and six days more than dog 96 also showed changes.

The findings in dog 50, which received cod liver oil after she had been diabetic for thirty-three days and showed very definite corneal pathologic changes, deserve consideration. If the involvement occurred prior to the administration of vitamin A it might be supposed that the administration of the vitamin would cure the condition. Such repair apparently occurs in rats to a considerable extent.[12] However, it may be that in the diabetic animal repair of the keratinized epithelium does not proceed at the same rate as in the nondiabetic animal, or that the repair processes themselves are impaired. Pending further investigation, dog 50 may be considered an exception that presents a very interesting problem on the subject of repair processes.

Just how far one is justified in considering the changes in these animals' eyes as being due to a lack of vitamin A is a matter of discussion. The changes observed are primarily those of keratinization of the epithelium and swelling of the endothelium. Changes similar to these have been reported in rats with a deficiency of vitamin A. Wason [13] described changes of varying intensity in her animals. The mild changes were characterized by slight keratinization of the outer corneal epithelium and loss of regularity of the inner layer of epithelial cells with leukocytic infiltration and edema of the stroma. When the changes were somewhat more advanced they were still confined to the cornea and lids, but the cornea showed thickening in the connective tissue. The outer layer of the epithelium became keratinized and leukocytic infiltration was more pronounced. Necrosis of the epithelium and of Bowman's capsule occurred in several eyes. When the changes were still more advanced the keratinization was more extensive, the demarcation between epithelium and connective tissue was very sharp and the anterior chamber was invaded by the inflammatory exudate. In still more advanced cases there was panophthalmitis with rupture of the cornea. Stephenson and Clark [12] reported similar observations. Wolbach and Howe,[14] in an excellent study of the pathologic process of deficiency of vitamin A in rats, reported keratinization of the corneal epithelium as the first change to occur in the eyes. This was followed by an increase in capillaries and leukocytic invasion. The substantia propria of the cornea later became edematous, and the external basal membrane was unrecognizable. We did not find any references to examination of eyes of dogs on diets deficient in vitamin A. Steenbock, Nelson and Hart [15] reported ophthalmia in young dogs but did not report any pathologic examination of the eyes.

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12. Stephenson, M., and Clark, A. B.: Biochem. J. **14**:502, 1920.

13. Wason, I. M.: Ophthalmia Associated with a Dietary Deficiency in Fat Soluble Vitamin (A), J. A. M. A. **76**:908 (April 2) 1921.

14. Wohlbach, S. B., and Howe, P. R.: J. Exper. Med. **42**:753, 1925.

15. Steenbock, H.; Nelson, E. M., and Hart, E. B.: Am. J. Physiol. **58**:14, 1921.

Apparently vitamin A is not the only factor in producing ocular symptoms in these depancreatized dogs. We are led to this conclusion because the vitamin A content of the livers of normal dogs that showed no ocular symptoms was no higher than that of diabetic dogs showing definite corneal changes. One explanation might be that the demands for vitamin A increase in the presence of a disturbed carbohydrate metabolism and that the changes are due to a combination of the two factors. That the changes are not the result of a loss of the pancreatic lipase was shown by the absence of corneal pathologic change in the two dogs in which the ducts were ligated and in the livers of which no vitamin A was found. In both the normal and the depancreatized dogs the feeding of vitamin A was reflected in the large amounts of the vitamin found in the livers.

It seems to us, therefore, that the occurrence of corneal pathologic change in depancreatized dogs not fed a good source of vitamin A suggests an increased demand for the vitamin in this condition. In view of the fact that the changes did not occur in the diabetic animals receiving an ample amount of the vitamin, we infer that the administration protected against the condition. Other workers [16] have described ophthalmia in depancreatized dogs and have cured it by administering cod liver oil. A group of symptoms which were highly suggestive of deficiency of vitamin A in such animals has already been described.[8] It was because of this that we were led to examine the eyes of our depancreatized animals, and the observations that we have reported here suggest that a relative deficiency of vitamin A may exist in these animals. Whether or not this might also hold true for the diabetic patient is a matter for consideration.

16. Hershey, J. M., and Soskin, S.: Am. J. Physiol. **98**:74, 1931.

Clinical Notes

A NEW BANDAGE FOR THE EYE ESPECIALLY RECOMMENDED FOR USE AFTER INTRA-OCULAR OPERATION

DEWEY KATZ, M.D., CHICAGO

The various types of ocular bandages used after intra-ocular operations invariably necessitate the use of adhesive tape. Most ophthalmologists change these bandages daily. In the removal of such a bandage the end of one of the strips of adhesive tape is lifted from the patient's face, usually by means of the finger-nail, and the strip is pulled away from the skin. This is repeated two or three times, depending on the number of strips of tape that were used. This somewhat painful procedure frequently causes sudden forcible squeezing of the lids. By such an act pressure is exerted on the eyeball, and undesirable complications may be produced.

To reduce the amount of discomfort and pain during the removal of the tape, a solvent for the adhesive substance is used, and the tape is gently drawn from the skin. Even this procedure is not entirely free from pain, and apprehensive patients react by varying degrees of blepharospasm.

To eliminate pain and its attendant results when the ocular dressing is changed, particularly for patients who have had an intra-ocular operation, a dressing which embodies principles that, to my knowledge, have not been described before was devised and has been found most satisfactory.

The size and shape of the eye pad used is nearly that of the orbital rim and approximately from ⅓ to ½ inch (0.85 to 1.27 cm.) in thickness. The body of the pad consists of absorbent cotton which has a layer of gauze on one side and a layer of cotton flannel on the other. The cotton flannel is soft, does not wrinkle readily and absorbs tears and secretion without irritating the skin of the lids with which it is in contact. A Fox aluminum shield is placed over the eye pad. The edge of the shield and a narrow zone on each side of the edge may be covered by adhesive tape.

A strip of adhesive tape, 1 inch (2.54 cm.) wide and from 3 to 4 inches (7.62 to 10.16 cm.) long, is so placed that its center crosses the lower nasal edge of the shield (fig. 1). Its upper half is made fast to the shield and its lower half to the skin of the cheek. A second piece of adhesive tape of similar size is placed in a corresponding position on the temporal side of the shield and the skin of the cheek. A third strip of adhesive tape, 1 inch (2.54 cm.) wide and about 6 inches (15.24 cm.) long, with from ¼ to ½ inch (0.64 to 1.27 cm.) of its lower end turned under, is placed so that the upper end is made adherent to the skin of the forehead near the midline (fig. 2). The strip of adhesive tape is carried down over the nasal side of the shield and the

From the Division of Ophthalmology, the University of Chicago.

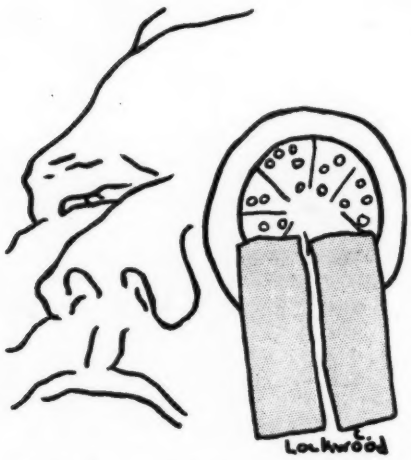


Fig. 1.—Drawing showing the eye shield secured in place by the short strips of adhesive tape.

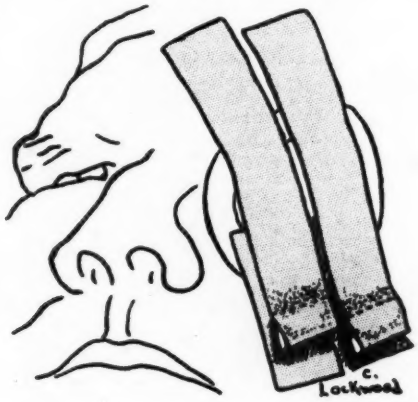


Fig. 2.—Drawing showing the position of the long strips of adhesive tape with the turned under lower ends.

Fig. 3.—Drawing showing the position of the strips of adhesive tape and the shield as the eye is examined.

nasal strip of adhesive tape and terminates just above its lower edge. The fourth strip of adhesive tape is applied in a similar manner temporal to the third strip. The adhesive portion of the third and fourth strips must extend beyond the lower edge of the shield so that the shield is kept securely in place and pressure of the desired degree can be applied.

When the dressing is to be changed and the eye examined, the turned-under lower end of one of the long strips of adhesive tape is grasped and pulled from the underlying short strip of adhesive tape and the shield. It is then placed on the forehead of the patient with its adhesive side exposed (fig. 3). This procedure is repeated with the other long strip of adhesive tape. The upper edge of the shield is lifted and swung downward after the manner of a trap-door. After the eye has been examined and treated and another pad applied, the shield is swung back into place, and the two long strips of adhesive tape are brought down into their former positions. The entire procedure is accomplished quickly and without pain to the patient.

In six or seven days the four strips of adhesive tape become somewhat soiled and may be changed.

In addition to the advantages this dressing has for the patient, the ophthalmologist will find that it has much to recommend it and that it fulfils the critical requirements of a satisfactory dressing for the eye.

LIPOMA OF THE ORBIT FOLLOWING IMPLANTATION OF FAT AFTER ENUCLEATION

BEULAH CUSHMAN, M.D., CHICAGO

Implants of fat were first used after exenteration of the globe by Barraquer in 1901. Marx and Lauber in 1910 and Gradle, from Elschnig's clinic, in 1915 reported on the use of such implants after enucleation.

In a review of the use of implants of fat in 1922, Sattler reported 104 cases from the ophthalmic clinic of Königsberg University. In 91 there was good healing, in 8 the wound opened without loss of the fat, in 3 the fat became necrotic and in 2 there was complete expulsion.

Steiner, in 1921, reported a marked shrinking of the implant of fat after from six months to two years in a case in which there was primary healing.

Sattler [1] stated in his article that implants of fat are usually most satisfactory in young patients and that the fat shrinks, as a rule, during the first four weeks and seldom after two months. In his cases a reform prosthesis was usually worn, but in 3 the implant enlarged to such an extent within a year that it was necessary to use a shell prosthesis.

From the Department of Ophthalmology, Northwestern University Medical College.

1. Sattler, C. H., in von Graefe, A., and Saemisch, E. T.: Handbuch der gesamten Augenheilkunde, Leipzig, Wilhelm Engelmann, 1922, p. 1809.

Gougelemann,[2] in an article on the fitting of artificial eyes, mentioned 4 cases observed in his experience as a maker of prostheses in which the implants of fat enlarged in a few years to such an extent that operation to remove a portion of the stump became necessary so that a prosthesis could be inserted.

In a personal communication, Gougelemann stated:

> . . the enlargement of the implants developed within a period of 18 months. A part of the implant was removed so that it would permit the insertion of a shell

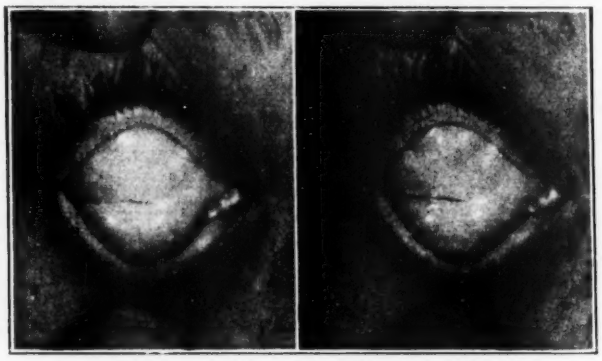


Fig. 1.—Lipoma following implantation in Tenon's capsule.

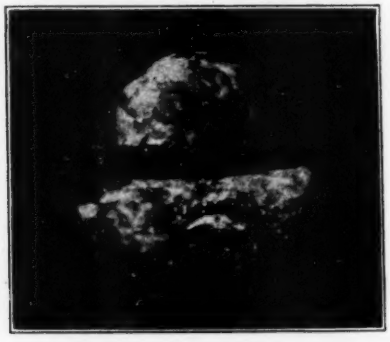


Fig. 2.—Encapsulated lipoma, 26 by 27 mm., after removal.

eye, and no further trouble was experienced, and they have all had occasion to call several times since. The fat shows no indication of development, nor is there any evidence of contraction.

REPORT OF A CASE

No record was found in the literature of such an overgrowth of an implant of fat as occurred in the case to be presented, but from the experience of Sattler and of Gougelemann the condition is probably not as rare as is supposed.

B. W., a girl, aged 15 years, came to Dr. Sanford Gifford in October 1932. The right eye had been removed by Dr. Harold Gifford twelve years previously,

2. Gougelemann, P.: The Fitting of Artificial Eyes: With Special Reference to Gold Ball Implantation, Arch. Ophth. **2**:76 (July) 1929.

following an injury with a piece of wire. The operation consisted of enucleation with an implant of fat in Tenon's capsule. For a few years the implant had increased in size, and for the ten months previous to examination the prosthesis could not be worn.

Examination showed the right orbit to be filled with a large mass which was lying under the conjunctiva and was bulging forward above and below a central band. The band was in the area of the conjunctival closure. At operation a large encapsulated mass of fat was found in the orbit, which was removed in toto. A

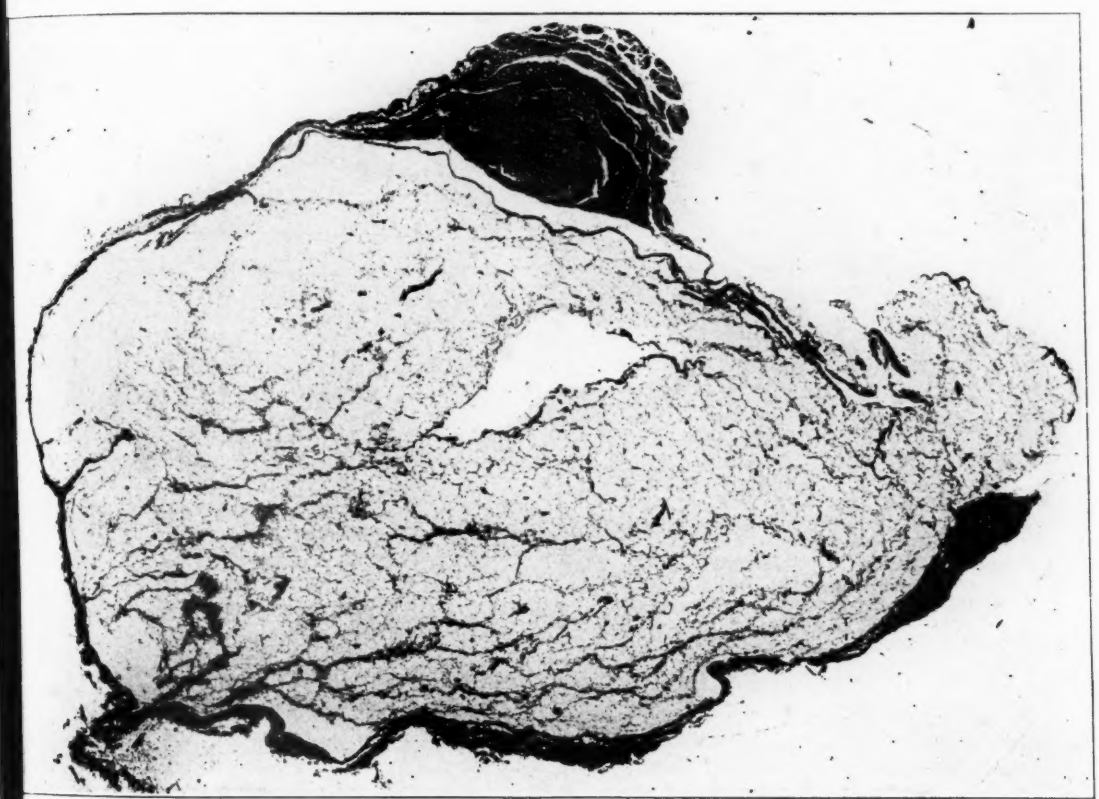


Fig. 3.—Photomicrograph of a portion of a lipoma of the orbit.

membrane, presumably part of Tenon's capsule, remained, and a 1 cm. glass ball was placed in this capsule and covered with sutures. Healing was uneventful, and a reform prosthesis was fitted about three weeks later.

The mass of fat was irregular and rounded and measured 26 by 27 mm. It was covered by a thin fibrous membrane, which was broken in a few areas, through which openings the fat bulged. On section the knife was covered with fat. The mass was entirely made up of fat with only a few thin, fibrous threads extending into it and separating it into lobules. The mass stained with sudan III, and the thin capsule, with hematoxylin and eosin. A small group of muscle fibers was adherent to the capsule in one area.

NEW SPECULUM AND LENS FORCEPS FOR THE INTRACAPSULAR CATARACT OPERATION

HANS SCHROEDER, M.D., NEW ORLEANS

To have the surgical field in operations for cataract as unobstructed as possible I have devised the speculum illustrated in figure 1. Its design is based on the principle of Demarre's retractor, but the latter unfortunately requires a special assistant.

A good speculum should have certain qualities. It must (1) raise the lids from the bulbus, (2) keep cilia out of the operative field, (3) be light in weight, (4) not obstruct the surgeon's hands, (5) be rigid enough to prevent the patient from squeezing his lids together, (6) stay in position, (7) be easily removable and (8) be easily sterilized. The instrument shown here fulfils these requirements.

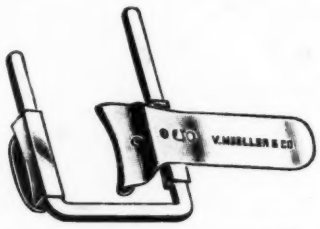


Fig. 1.—A new speculum for use in intracapsular operation for cataract.

Fig. 2.—A new lens forceps for use in intracapsular operation for cataract.

The longer end of the U-shaped piece is for handling this part of the instrument.

The bridle suture knob is on both lid pieces. Depending on the surgeon's position and the contour of the patient's face, the handle of the retractor can be placed up over the patient's forehead or over the cheek below. I prefer it on the cheek.

The U-shaped piece of the speculum is supplied in two sizes, one with a 25 mm. opening for ordinary use and one with a 32 mm. opening for use with an unusually large bulbus.

The lens forceps is a modification of Terson's capsule forceps. While the other grasps the capsule, this is designed to grasp the lens substance and to ignore the capsule.

As with all procedures—and instruments as well—this method has its limitations and cannot be used for immature and hypermature cataracts. Obviously, in these instances the nucleus is surrounded by too much fluid and the teeth cannot grasp the nucleus.

V. Mueller & Company, Chicago, make these two instruments available to the medical profession.

Ophthalmologic Review

HYALINE BODIES (DRUSEN)

CARL D. F. JENSEN, M.D.
SEATTLE

The presence of hyaline bodies, called by the Germans *Drusenbildungen,* or granular formations, on the optic disk is rare.

Ophthalmoscopically the disk is seen to be swollen, and one may have the impression that the condition is optic neuritis. The swelling may amount to 12 or 14 diopters. The vision is often unimpaired. More careful investigation shows that the swelling is due to masses of small translucent nodules. These are variously distributed; they may surround the vessels at their exit from the nerve, thus involving only the central parts of the disk; in other cases they are situated mainly at the edge of the disk, which they obscure. They may cover the entire surface and even invade the surrounding retina for a limited distance, or they may form a ring round the disk. Both eyes are usually affected in unequal degree. The eyes are often otherwise healthy, but in many of the cases recorded there has been retinitis pigmentosa. In other cases concurrent disease has probably been fortuitous. The prognosis is good.

H. Müller in 1858 first described concretions at both optic disks, which occurred in an almost blind man. The nerves were atrophic and the retinas tigroid. The concretions, which were calcareous, were in about the position of the lamina cribrosa and were absent from other parts of the nerve and retina. In spite of the atrophy of the nerve, the level of the disk was raised from 0.4 to 0.5 mm. above the level of the retina.

Iwanoff in 1868, in a paper on optic neuritis, described concretions in the optic nerve anterior to the lamina cribrosa in six cases. In the first case both eyes were affected, and the vision had been completely intact during life. In the second case also both eyes were affected; there was absolute amaurosis, and the patient was insane. In the remaining four cases only one eye was examined; the eyes were lost as a result of injury or of a foreign body. In longitudinal sections there were generally two large concretions on each side of the central vessels. These consisted of a great number of quite small, concentrically laminated nodules, resembling amyloid bodies but giving no amyloid reaction. Iwanoff regarded them as "drusige Ablagerungen der Glaslamelle

der Aderhaut, welche vom Rande der letzteren aus in den Sehnerven eingedrungen sind" (hyaline deposits of the lamina basalis of the choroid, which from the rim of the latter have penetrated into the optic nerve).

Liebreich was the first to observe the bodies ophthalmoscopically, as he stated in his comment on Iwanoff's paper. According to him, in such cases, the striking effect of the nerve fibers is more marked, and bodies are seen in the papilla which reflect the light strongly. They sometimes extend beyond the choroidal ring, and there is often no defect of vision.

Neiden in 1878 described a similar picture in a girl, aged 14 years, with retinitis pigmentosa. There was no consanguinity of the parents, and eight other children were normal. Both eyes were affected, the left more than the right.

Jany in 1879 gave details of a well marked case in which the vision was good and the fields normal. The patient, a woman aged 37, complained of headache and pain in the eyes, which improved under treatment but without alteration in the ophthalmoscopic picture.

Oeller examined microscopically the eye of a woman aged 37 which was affected with retinitis pigmentosa and had been injured when the patient was 1 year old. There was a mass of laminated concretions lying in the nerve fiber layer at the outer side of the disk. They had the same consistency as the surrounding tissues, stained faintly with hematoxylin and did not give any amyloid reaction. There were no concretions near the lamina cribrosa, but drops of exudation of all sizes which stained with hematoxylin. Oeller combated Iwanoff's theory that the concretions were colloid bodies and believed that they might be droplets of myelin.

Lawson in 1883 recorded the first case in England.

> In the right eye upwards and outwards from the disc is a large white translucent patch, composed of very numerous confluent bead-like bodies, looking like the grains of a psammoma. The mass projects forward 2.5 D with the ophthalmoscope, the refraction at the most prominent part of the mass being H. 2.5 D. The margin of the disc is about half surrounded by a somewhat similar deposit, translucent but not beaded. In the left eye two patches of the confluent beads are present, also near the disc, but the patches are smaller. The larger patch is seen with plus 3D. There is a diffuse choroido-retinitis.

The patches were watched for many weeks but showed no change.

At the same meeting in 1883 Story presented a case with "anomalous distribution of the retinal arteries," probably due to previous blocking of the superior nasal artery. On the temporal half of the right disk, rather near the center, there were two grayish-white circular spots. Story mentioned a case of Benson's in which similar bodies covered the disk and extended over its edge at several points.

Stood in 1883 described the clinical characteristics of two cases with (doubtful) optic neuritis. The first case was that of a man, aged 31, with chronic myelitis, paraplegia and paralysis of the sphincter muscles of two years' duration. Both eyes were affected. There was good vision, with contracted fields and diminution of the light sense. The nodules were mostly on the temporal side of the disk and toward the periphery. There was apparent optic neuritis. Eight years later the nodules were much the same but the disk was pale and showed signs of atrophy of the optic nerve. The other case was that of a girl, aged 17, with hypermetropic astigmatism and convergent strabismus. Both eyes were affected, the nodules occupying a similar position on the temporal sides of the disks and the centers being free. In the left eye there was anastomosis of two arteries on the nasal part of the disk, and in the right eye a tag of persistent hyaloid artery projected into the vitreous. Central vision was good; there were contracted fields and diminished light sense.

Masselon in 1884 described and figured the ophthalmoscopic picture in the eye of a man, aged 57, with perfect visual acuity. There were groups of hyaline bodies on both disks, especially in the upper parts, the left disk being covered with them. They were each about the diameter of the large veins but varied above and below this size. Apart from them and the swelling caused by them, the fundi were quite normal. In a girl, aged 20, with retinitis pigmentosa, vision was ¼ and the fields were contracted. There were hyaline spots at the periphery of the fundus in the neighborhood of the proliferated pigment epithelium. These were possibly ordinary colloid bodies. The disks were normal.

Hirschberg and Birnbacher in 1884 found drusen on the papilla of a woman, aged 60, who died of cerebral hemorrhage. There was enormous swelling of the arachnoid sheath of the nerve in this case.

Ancke in 1885 gave an instructive account of two families with retinitis pigmentosa. In each case three of five children were affected, and all of those affected had *Drusenbildungen* except one, the youngest, aged 14 years. The ages of the other children varied from 16 to 19, and the condition in one was of the unpigmented type. In one boy, aged 16, the hyaline bodies had not developed at the age of 14.

Remak in 1885 described the ophthalmoscopic picture in a man, aged 52, with atypical retinitis pigmentosa. The right eye was shrunken, the result of a perforating wound. The lens of the left eye was removed in its capsule because of cataract. It was then discovered that there was partial atrophy of the optic nerve, with hyaline bodies on the disk. These consisted of from five to six large round or oval, bluish-white masses on the inner side of the disk. A few fine vessels passed over them; there were no vessels over the retina. The patient was able to see fingers at 1.5 meters.

Wedl and Bock presented in their pathologic atlas a picture of a section of the nerve head from the eye of a patient who died of chronic hydrocephalus at the age of 24. There were several large calcareous masses made up of a congeries of small nodules, the smallest being on the surface.

Gessner in 1888 described the clinical history and ophthalmoscopic picture in a case of traumatic exophthalmos. There were three prominent concretions resembling mother-of-pearl on the temporal edge of the disk. Vision was 1/8.

Nieden considered the subject again in 1889, citing six cases. He presented two good illustrations of the ophthalmoscopic picture, in one of which the hyaline bodies covered the edges of the disk while in the other they were confined to the central parts. In a man, aged 29, both eyes were affected, the right more, the hyaline bodies being confined to the edges of the disk and the center remaining free. Vision in the right eye was 1/2. The patient could read Jaeger's test type no. 4. The field for blue was contracted, probably owing to pressure on the nerve fibers. After adaptation to the pressure the vision rose to 10/15, and the patient was able to read Jaeger's test type no. 1, but the field for blue remained contracted. The mass reached forward 4 mm. (plus 12 diopters) into the vitreous. The pressure on the vessels was not sufficient to give rise to pulsation, and when the globe was pressed with the finger only the usual venous pulse was elicited. Vision in the left eye was 6/6, and the patient could read Jaeger's test type no. 1. In another case, that of a man aged 28, both disks were affected in the center; in the left the hyaline bodies had spread outward and reached the edge of the disk in places; in the right they had nowhere extended so far. Vision in the right eye was 6/6, and the patient could read Jaeger's test type no. 1. There was a small corneal abrasion, which rapidly healed; no other disease was present. The left eye was amblyopic; otherwise it was healthy. In two of the other cases there had been severe injury to the head, and the *Drusenbildung* was unilateral. It commenced several months after the injury and in itself had nothing to do with the failure of sight. One patient, a man aged 24 with hyaline bodies at the edges of the disks, had neurasthenia and other cerebral symptoms. Vision was normal.

Hirschberg and Cirincione in 1891 published an account of a case of hyaline bodies at the disks associated with a sarcoma of the choroid. They were therefore able to examine the eye both ophthalmoscopically and pathologically. The patient was a woman aged 59; both disks were affected. Vision in the right eye was normal; in the left eye it was 1/3. The field contracted up and in, corresponding to the site of a choroidal sarcoma. The appearance in the right eye was typical. In the left eye, after removal, a large mass, 1.5 mm. broad by 0.85 mm. thick, was

found on the lamina cribrosa. It was made up of the usual laminated hyaline bodies, partially calcified. They were cleared up by hydrochloric acid, evolving gas, but were not dissolved. They were not amyloid.

Gurwitsch in 1891 described similar concretions in the eye of a man, aged 34, who died of chronic interstitial nephritis. The laminated nodules were situated in front of the lamina cribrosa, at the edges of the nerve, near the choroid. Small hyaline globules were scattered widely through the nerve in front of the lamina cribrosa, and there were some in the internuclear layer of the retina. Hyaline bodies were absent from the nerve of the other eye.

Purtscher presented a woodcut of the ophthalmoscopic picture of typical hyaline bodies from the eye of a woman aged 35. Both eyes were affected. Vision in the right eye was 6/9; the patient could see fingers at 0.3 meter with the left eye.

Terson in 1892 reviewed the subject in a paper entitled "Les verrucosités hyalines de la portion papillaire du nerf optique."

De Schweinitz, in 1892, was the first to draw attention to the subject in America. His patient was a man, aged 45, who was weak-minded, probably as the result of drink; he had been shot in the head twenty years before. The ophthalmoscopic pictures in the two eyes was closely similar: a slightly prominent papilla, with globular masses forming a circle just within the apparent margin, most prominent above and capped by glistening particles. The patient could see fingers at 3 feet (1 meter) with the right eye and at 6 feet (2 meters) with the left eye. Sections showed oval masses of concentrically laminated nodules on each side of the central vessels. The whole length of the optic nerve and all the cranial nerves were examined without any similar bodies being found. The nerves were atrophied, but not as a result of the drusen. There were no colloid bodies in the lamina basalis of the choroid.

Noyes, in discussing de Schweinitz' paper, mentioned the case of a young man who had scarlet fever, albuminuria and neuroretinitis. Both eyes were affected and remained unchanged for twelve years.

Gifford recorded the case of a girl, aged 11 years, with very extensive disease of the right disk. Vision was limited to doubtful perception of light. The papilla and the surrounding retina for about one-half disk diameter were entirely concealed by a mass of hyaline bodies, the summit of which was 9 diopters above the rest of the fundus; below the papilla this mass, after a slight constriction, was continued into another about twice the diameter of the disk. The superior, superotemporal and superonasal arteries were occluded and formed glistening bands in the vitreous; there were a number of fine reddish opacities, mostly in the posterior part, evidently from comparatively recent hemorrhages. The left eye was normal. The mass altered considerably

during more than two years' observation. This case shows that the prognosis is not always good, but the loss of vision may have been due to concurrent vascular disease. In a man, aged 45, with marked hyaline bodies in both disks, Bright's disease developed a year later, leading to death at the end of another year.

De Schweinitz in 1894 published reports of two cases in which there were similar bodies at the macula.

Heyl in 1895 published a report of a case of "albuminoid (?) deposit on the optic disc and retina." The disk showed typical drusen; there were a similar mass at the macula, a large isolated nodule in the retina to the inner side of the disk and a faint white infiltration elsewhere, with punctate black spots in patches. The other eye had the same condition in less marked degree. The patient had a mitral systolic murmur and edema of the legs; there was no albumin or tube casts.

Sachsalber in 1895 gave an extensive report of a case in a woman, aged 42, who was weak-minded and died of carcinoma of the stomach. Both disks had a few hyaline bodies at the edges, projecting 4 diopters. The eyes were otherwise normal. Vision in the right eye was 6/9 and in the eleft eye, 6/6.

Thompson in 1898 presented a case of drusen of the nerve head in a patient, aged 29, who had had atrophy of the optic nerve following neuritis. Mendel in 1900 had a patient, aged 24, with chlorosis. The fields and vision were normal. Vision was 5/4 in both eyes. The patient had drusen of both nerve heads. Stanford Morton in 1903 had two patients. One was a man, aged 24, with retinitis pigmentosa and drusen of both nerve heads. Vision in the right eye was 6/24 and in the left eye, 1/60. The other patient was a girl, aged 20; vision in the right eye was 6/9 and in the left eye, 6/5—; there were full form fields with drusen of both nerve heads.

Parsons in 1903 reported a case of drusen of the nerve head in which pathologic examination was made. Hanke in 1904 reported the case of a girl, aged 9 years, with hypermetropia and vision in the right eye of 6/5. There was a large white drusen mass extending 6 diopters into the vitreous. Streiff in 1904 presented five cases. One case was that of a youth, aged 17, with bilateral choked disks. Three years later drusen were noted on both nerve heads. Vision was 6/8 in both eyes. The second case was that of a patient, aged 32, with bilateral choked disks; in ten months drusen were found in the left eye; vision in the right eye was 6/12 and in the left eye, 6/18. The third case was that of a youth, aged 20, with drusen of the nerve head; the vision and fields in the right eye were normal. The fourth case was that of a man, aged 26, who had drusen of both nerve heads with normal fields and vision. The fifth case was that of a woman, aged 55, who had drusen of both nerve heads with irregularly contracted fields and nerve heads showing partial atrophy; vision in the right eye was 6/6 and in the left eye, 6/8.

Demaria in 1904 examined an eye of a patient aged 54 which had been enucleated for glaucoma and found the sclerochoroidal canal filled with a large conglomeration of corpora amylacea. Cirincione in 1904 examined the eyes of two patients microscopically. He found a deposition of hyaline substance in the optic nerve between the meshes of the supportive tissue. The fibers were separated in many areas without injury to the function or structure of the nerve.

Rabitsch in 1905 reported the case of a woman, aged 24, who had had poor vision since childhood. There was no history of injury or symptoms pointing to inflammation. Vision in the right eye was 2/10, with the visual field showing very small contraction. Vision in the left eye was 6/10, with large contraction of the fields. Schuster in 1905 reported the case of a man, aged 37, with drusen of both nerve heads. There was a large, white glistening mass extending 2 diopters into the vitreous. The left lens had a small congenital opacity. The fields of both eyes were normal.

Herman in 1906 reported the case of a patient with a piling up of hyaline material on the left nerve head. In the same eye at the macula there was a small, shiny white mass or area with no elevation. Bonhoff in 1906 reported a case of pseudoneuritis with drusen of the nerve head. The patient, aged 18, had normal vision in both eyes. The drusen appeared as a round, piled-up mass of the nerve head elevating the central vessels.

Fejer in 1909 reported a case of drusen of both nerve heads. There was no perception of light in the right eye, and vision in the left eye was 5/30, with the visual fields cut to 10 degrees. The patient had considerable involvement of the central nervous system with paralysis of both oculomotor nerves. The condition was diagnosed as tumor of the brain.

Hoeg in 1908 presented five cases of drusen. The first case was that of a woman, aged 23. Vision in the right eye was 5/9 and in the left eye, 5/6. The visual field of the right eye was contracted and had an enlarged blindspot. The visual field of the left eye was normal. The right eye had a large drusen mass of the nerve head. The patient had been treated previously for optic neuritis of the nerve head. The second case was that of a woman, aged 36, with a large drusen mass of the right eye. The mass had a prominence of 4 diopters and covered an area of 1.5 disk diameters. The visual field of the right eye showed an enlarged blindspot with a small defect in the temporal sector. The other three cases were instances of uncomplicated drusen of the nerve head. The vision and form fields were normal in each case.

Wetzel in 1911 reviewed the literature on drusen and reported the pathologic changes in two cases. The first case was that of a woman, aged 52, whose eye was enucleated on account of phthisis bulbi. In

the second case an eye was enucleated for a ring abscess. There was a large hyaline mass in both cases which pushed the nerve fibers apart.

Coates in 1912 described a number of mineral-like concretions in the substance of the papilla. He stated: "It is composed of a conglomeration of partially fused masses, each of which has a wavy concentrically laminated structure. The peculiarity of this case was the occurrence of numerous corpora amylacea in the retina."

Paderstein in 1912 reported the case of a man, aged 36, with drusen of the right eye. The vision and form fields were normal in both eyes. Sartorius in 1914 reported the case of a boy, aged 12 years, with drusen of both nerve heads. The vision was 5/5 in both eyes with normal form fields. He also reported a case of a housewife, aged 47, with drusen of the right eye. The vision and form fields were normal.

F. A. Juler, in 1914, reported a case in a patient, aged 44. The vision was 6/36 in both eyes. The right eye showed old areas of choroiditis. No drusen were seen. The left eye showed drusen of the nerve head with swelling of 2 diopters. There was considerable degeneration of the retina which affected the macular region. The visual fields in both eyes showed peripheral contraction with central scotoma.

Lauber in 1921 reported fourteen cases and included a pathologic study of the case of Rabitsch in 1905. Six of the cases reported were bilateral, with normal vision and full fields. In one case vision was 10/12 and there was choroidal atrophy on both sides of the disks. One patient showed a blind right eye, and fingers were seen at 1 meter with the left. Both nerve heads showed drusen and atrophy. The atrophy was due to a pituitary tumor. Another complicated case was one of amblyopia due to extensive use of tobacco and alcohol in which there was drusen of both nerve heads and central scotoma.

Lauber also reported the cases of a mother and two daughters who were studied over a period of many years. In the mother and one daughter there had been an increase from a prominence of 1.5 to 3 diopters. The fourteenth case was that of Rabitsch, in which there was later reduction in vision and the field for form. Microscopic examination in Rabitsch's case showed the papilla protruded markedly above the surface of the adjacent retina owing to the presence of the hyaline bodies, which occupied almost the entire space between the surface of the disk and the lamina cribrosa. The covering layer of nerve fibers was very thin. In places the nerve fibers were wholly lacking, and the hyaline bodies were surrounded by proliferated glia. In the larger nodules were cavities containing glia tissue, vascular rests and a little connective tissue. The optic nerve behind the lamina cribrosa was markedly atrophic; the subdural space was enlarged, and the septums were close together. A reactive proliferation of the connective

tissue in the optic nerve was noted as in any case of primary atrophy of the optic nerve with no cellular increase. Where the hyaline masses had penetrated into the retina the granular layers were separated so that the normal structure of the retina could no longer be recognized.

The pigment epithelium was gone in places. Here and there the pigment cells had clumped. In places where the cells had maintained their normal distribution the pigment was almost entirely lacking. In one place it was noted that the hyaline membrane of the choroid near the insertion of the optic nerve was missing; here the pigment epithelium had lost its normal structure. Connective tissue had formed, which penetrated from the choroid into the retina.

The pigment epithelial cells, which can be recognized by the nature of their pigment, had wandered forward in the retina and were also found in the immediate vicinity of a small, evidently fresh hyaline body.

A series of tests were performed which proved that the bodies were hyaline and bore no relation to the hyaline membrane.

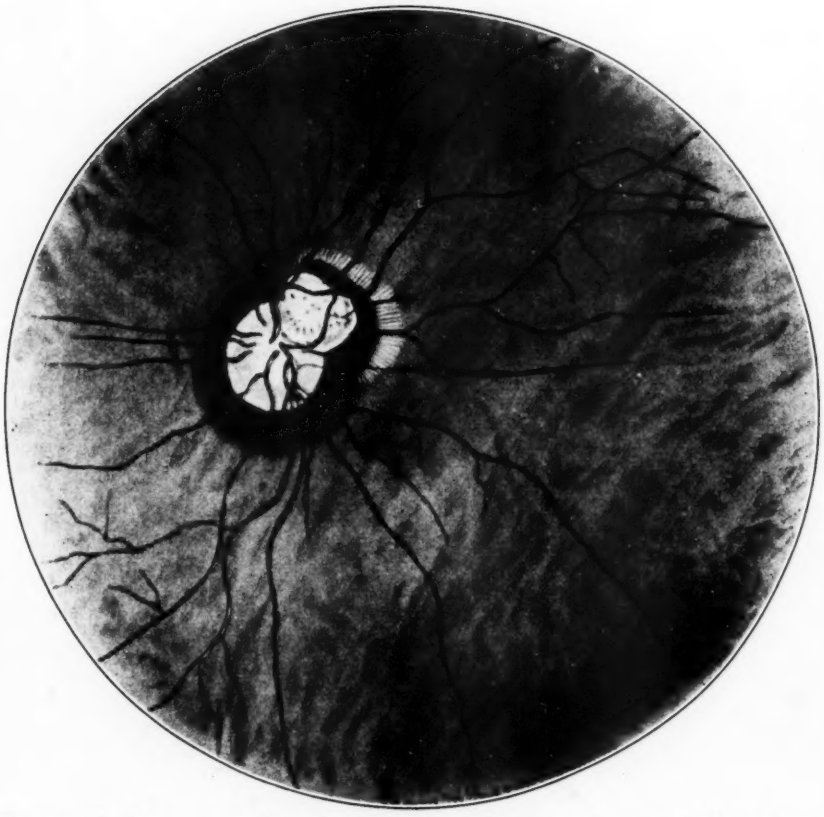
From these findings it seems plausible to assume that the hyaline bodies are due to misplaced pigment epithelial cells. Occasionally one finds in the papillary tissue, usually in the prolongation of series of pigment epithelium cells, displaced single or small groups of pigment epithelial cells, which have not been accorded any significance.

Goldstein and Givner reported a case with the pathologic changes. The patient, aged 45, was treated in a hospital for uremia. There were drusen of both nerve heads and a few hemorrhages over the fundus. The patient died. The pathologic examination revealed a mass of concentrically arranged layers having no cellular structure and devoid of a capsule. "It was surrounded on its projecting surface by a proliferating glial membrane, in the structure of which were seen several discrete smaller masses of calcification."

Tobler made an extensive microscopic study of drusen of the nerve head, studying three hundred and seventy eyes of patients of all ages. He reported three cases showing the usual findings, with the exception of one case with a degeneration of the macula. Tobler concluded his study and agreed with Leber that "the Drusen was purely local metabolic disturbance of unknown etiology in which a poorly soluble hyaline substance is produced with deposition and appositional growth like mineral crystals."

Lohlein reported five cases of drusen. Three patients had come to him for glasses. One patient had pneumococcic conjunctivitis and another tuberculous choroiditis. Eight of the eyes showed a collection of pigment around the nerve head, which made it hard to recognize the choroid through the retina. Lohlein agreed with Lauber that the drusen were a result of a degeneration of the pigment epithelium.

I am reporting a case of drusen of especial interest due to the early age at which the condition was noted. I watched the patient for one year at the Wills Hospital. She was a white girl, aged 9 years, who complained of the eyes turning in. The squint was first noticed three years previously. She had worn glasses for three years. External examination revealed an alternating squint. Vision in the right eye was 6/60, while with the correction it was 6/12 + 4; in the left eye it was 6/9, and with the correction it was 6/6 — 1.



Photograph, from a painting, of the fundus in the author's case, showing drusen.

Ophthalmoscopic examination revealed the media in the right eye to be clear. The nerve head was oval; the axis, 90 degrees. A tumor arose from the upper part of the nerve head, extending with its greater bulk in the retina. The mass was two thirds the disk diameter in size, having a mottled grayish appearance. The arteries and veins rode up over the tumor, giving the mass a definite elevation of 2 diopters. The tumor had a slightly translucent appearance. To the upper and nasal side of the tumor there was a definite tension reflex of the retina, known as the Weiss reflex. The remainder of the fundus was normal. The

media of the left eye were clear. The fundus was normal, except for a small spot of pigment on the nerve head. In subsequent examinations no change was noted in the fundus. The size and color of the tumor have remained the same.

The alternating squint remained the same, becoming more marked when the patient did not wear her glasses. In the right eye, + 4.50 sph. + 75 cyl., axis 90°, gave vision of 6/9 — 3; in the left eye, + 4 sph. + 1 cyl., axis 95°, gave vision of 6/6 — 1.

The fields were normal except that the blindspot extended into the area occupied by the drusen mass. Examination of the nose and throat showed that the tonsils had been removed and a small adenoid tag remained; otherwise the results were negative. The Mantoux test was negative. A roentgenogram of the lungs gave a negative picture. The Wassermann reaction was negative. Medical examination showed the heart and lungs to be normal.

SUMMARY

Drusen is the term used in speaking of the presence of hyaline bodies on the optic disk. Ophthalmoscopically one may see on the disk white to yellowish elevations ranging from 0.5 to 14 diopters. These swellings are masses of small translucent nodules. These are variously distributed over the disk. The two eyes are usually affected in unequal degree. The eyes are often healthy. Retinitis pigmentosa has been recorded in many cases. In many cases other diseases have been noted, but they had little bearing on the condition.

Microscopic examination reveals fibers in front of the lamina cribrosa and protruding above the surface of the retina.

The etiology of drusen is unsettled. Lauber advanced the theory that the hyaline bodies are due to misplaced pigment epithelium. Tobler agreed with Leber's theory that they are due to an unknown local metabolic disturbance in which a poorly soluble hyaline substance is produced and deposited in the nerve head. Parsons believed that drusen originated from exudates laid down in the nerve head, possibly from a previous inflammatory process which may have left no evidence of its existence. Fuchs brought forth the theory that the origin is from the neuroglia. The finding of many hyaline deposits in the neuroglia lends some support to the latter idea.

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Abstracts from Current Literature

EDITED BY DR. WILLIAM ZENTMAYER

Anatomy and Embryology

ANATOMIC, PHYSIOLOGIC AND CLINICAL DIFFERENCES BETWEEN THE UPPER AND THE LOWER HALF OF THE EYEBALL. M. HANDMANN, Klin. Monatsbl. f. Augenh. **93**: 609 (Nov.) 1934.

Handmann gives a synopsis and a discussion of all the known regional differences between the upper and the lower half of the eyeball, which exist notwithstanding the fairly spherical shape of the eyeball.

Conjunctival Sac.—He states that drugs affect almost solely its lower portion. Mydriatics affect the lower portion of the iris first, and the dilating pupil seems to be dislodged downward. The upper portion of the conjunctival sac, on the other hand, is more free from bacterial infection. Trachoma, which is comparatively free from bacteria, makes an exception. A horizontal fold of the conjunctiva of the bulb, observed in old persons, occurs on the lower portion of the limbus only.

Cornea and Sclera.—Loops of the intrascleral ciliary nerves were observed by Axenfeld chiefly in the vertical meridian of the lower portion of the anterior section of the globe.

It is important for corneoscleral trephining that the conjunctival leaf of the limbus extends farther into the cornea above, so that the distance of the angle of the chamber from the limbus is larger above than below. The so-called palisade system is noted mostly on the lower limbus; Stähli's epithelial pigmentation of the normal cornea, Handmann's binocular symmetrical furrow of the cornea, ribbon-shaped degeneration of the cornea and, of course, deposits on the interior surface of the cornea are seen in the lower portion of the cornea. In the upper portion of the cornea, on the other hand, one observes the following conditions: Handmann's fine refracting horizontal line; trachomatous pannus; the fatty degeneration of the limbus called "peripheral furrow" or "peripheral ectasia"; minor resistance of the sclera near the limbus, giving rise to ruptures, intercalary staphylomas and subconjunctival luxations of the lens, and ruptures of the limbus by gummas of the ciliary body. Spontaneous partial binocular senile atrophy of the sclera occurs above the limbus; marginal keratitis, chiefly on the upper portion of the limbus.

Iris.—Among the many physiologic and pathologic items enumerated relative to the iris, these are mentioned: The upper pupillary margin shows flocculi most frequently; the upper pupillary seam is larger than the lower; the upper portion of the iris shows a greater tendency to mydriasis in glaucoma than the lower, while tuberculosis of the iris affects preferably the lower portion.

Lens.—Handmann states that 80 per cent of the cataracts begin in the lower portion of the lens; no reason for this fact could be deduced from the literature. "Rust spots" of the capsule of the lens occur in the lower part in siderosis.

Choroid and Retina.—Chorioretinitis predominates in the lower portion of the eye in siderosis. Glaucomatous excavation becomes marginal at first in the lower temporal portion of the disk. No differences of the vascularization exist in the upper and lower portions of the choroid or the retina, except a few clinical ones mentioned by Leber. The extension and number of the bipolar and ganglion cells are larger in the upper portion of the retina of birds. Tears of the retina occur and detachment develops mostly in the upper portion, but the detachment may shift to the lower portion by accumulation of the subretinal exudate, while the upper portion may reattach.

K. L. STOLL.

Biochemistry

THE LIPIDS OF RETINA, BRAIN AND BLOOD. P. J. LEINFELDER and P. W. SALIT, Am. J. Ophth. **17:** 619 (July) 1934.

The authors give the following summary:

"The percentage composition of the principal organic constituents of the retina, blood, and brain is given. The water content of retina is 10 per cent higher than either blood or brain. On the wet basis the proteins vary considerably, with retina 6 per cent, brain 10 per cent, and blood 15 per cent. The total lipid content, on a basis of wet weight, is 11.4 per cent in brain, 3.4 per cent in retina, and 1.0 per cent in blood; i. e., it is much higher in brain than in retina or blood. The composition of the lipids is fairly uniform in the three tissues. Lecithin constitutes a greater part of the total lipids of the retina (27 per cent) than it does of blood or brain (18 per cent each). Cholesterol forms only 6.5 per cent of the retinal lipids, whereas in brain and blood the figures are approximately 17 per cent. There is only a trace of kephalin in the blood lipids, however retina contains 11.2 per cent and brain 16.6 per cent. The glycolipid fraction of retinal and brain lipids is practically the same (5.8 per cent), while it constitutes 28 per cent of the blood lipids. The 'unidentified' fats form a large percentage of the lipids, 41 per cent in retina, 31.5 per cent in brain, and 27 per cent in blood. The iodin number for retina (22.9) is practically the same as that for brain (24.2) whereas the number for blood is considerably lower (13.4)."

W. S. REESE.

Conjunctiva

GONORRHEAL OPHTHALMIA. J. I. FARRELL, Am. J. Ophth. **17:** 591 (July) 1934.

Farrell gives the following summary and conclusion:

"1. Case records of 189 patients with gonorrheal ophthalmia have been reviewed to see if those patients who had gonorrheal genital infection recovered more quickly and with fewer complications than the others.

"2. In 109 of these cases there was a venereal infection.

"3. The average period of hospitalization was 28.41 days; of those with no venereal infection 27.41 days, and of those who had a genital infection 29.42 days.

"4. Of the 116 patients who recovered with excellent vision, 67 (57.76 per cent) had a venereal infection.

"5. Of the 15 patients who recovered with good vision, 8 (53.33 per cent) had a genital infection.

"6. Of the 9 patients who recovered with fair vision, 5 (55.55 per cent) had a venereal infection.

"7. Of the 5 patients who recovered with poor vision, 2 (40.00 per cent) had a venereal infection.

"8. Of the 25 patients who recovered with very poor vision, 12 (48.00 per cent) had a venereal infection.

"9. Of the 16 patients who lost an eye by enucleation or evisceration, 12 (75 per cent) had a genital infection.

"10. There were four patients who had an infected socket but only one of these had an infection of his only eye, and he was the only one who did not have a genital infection.

"11. Fifteen patients received foreign-protein therapy but the results were not encouraging.

"12. Of the 135 patients who had an infection of only one eye on entry, only 8 (5.92 per cent) developed an infection of the other eye.

"The prognosis of a patient's gonorrheal ophthalmia cannot be judged by the presence or absence of a similar genital infection."

W. S. REESE.

PARINAUD'S CONJUNCTIVITIS. C. E. HARNER, Am. J. Ophth. **17:** 629 (July) 1934.

Harner reports a case of Parinaud's conjunctivitis. The disease evidently had been contracted from a cat which had acquired lesions of the paws, face and eyes from contact with ground squirrels in southern California. He comments as follows:

"The case presented is one of true Parinaud's conjunctivitis and seems to eliminate any doubt that it is a definite clinical entity. The Leptothrix of Verhoeff was identified and the infection was proved to be neither tuberculous nor due to Bacterium tularensis. It seems reasonably certain that the organisms were transmitted to the patient through the medium of a cat from infected ground squirrels.

"The technic for demonstrating the Leptotriches requires great delicacy and care.

"The infected glands began to recede as soon as the large necrotic hyperplastic focus was excised and this procedure in addition to vigorous treatment with silver nitrate would appear to be a satisfactory treatment and a prophylactic against gland suppuration. It takes many weeks before the glands return to normal size."

W. S. REESE.

SIXTEEN CASES OF PERIOCULAR DEGENERATION OBSERVED IN INDO-CHINA. DODERO and CORNET, Ann. d'ocul. **171:** 741 (Sept.) 1934.

In 1906 Morax spoke of 70 observations of periocular degeneracy, particularly in Russia, among which were included those of Van Duyse, Gallemaerts and Hogmann, in Europe. In 1912 Morax and Landrieu

published the first report of a case of periocular degeneracy in France, and in the same year Casaux reviewed 90 cases recorded in the literature to which he added 2 cases met with in Indo-China. In 1925 Wright reported a case, as did Najditsch in 1926. The total number of cases to the present is about 120.

Dodero and Cornet divide periocular degeneration into: (1) simple forms (degeneration of the palpebral conjunctiva affecting the tarsus; degeneration of the tarsus; submucous conjunctival degeneracy) and (2) mixed forms (palpebral tarsoconjunctival degeneration; submucous tarsoconjunctival degeneration; complete degeneration of the palpebral conjunctiva). Eighteen observations are described in detail. Dodero and Cornet believe in the existence of all these degenerations and their evolution one from another. When the change is slow, certain stages can be well observed, but for accuracy it is necessary to follow a certain number of patients through life, making deductions periodically. Far from rejecting trachoma as an etiologic factor, they give it an important place, without eliminating other possible causes. S. H. McKee.

Conjunctivitis Caused by Bacillus Proteus-Vulgaris. Z. Nižetić, Ann. d'ocul. **171:** 998, 1934.

Bacillus proteus-vulgaris has not, as a rule, been considered pathogenic, though recently certain writers have attributed pathogenic action to it. It has even been cited as the cause of a septicemia. Nižetić mentions Axenfeld's textbook and the works of a number of other writers to show that nowhere has he been able to find any record of a pathogenic action of B. proteus-vulgaris in the eye. For this reason he publishes in detail the account of a conjunctivitis in a patient, 26 years of age, who had been under the care of numerous other oculists before being observed by Nižetić. S. H. McKee.

Caterpillar Conjunctivitis. H. Villard and C. Déjean, Arch. d'opht. **51:** 625 (Oct.) and 719 (Nov.) 1934.

Forty cases of this rare disease have been described in the literature; almost all have occurred outside France. Villard and Déjean have collected seven new cases, with which they describe two cases previously reported by Prof. H. Truc, the reports of which have not been published, making a total of nine. All the cases described in the literature are chronologically reviewed. The various species of caterpillar which have caused disease of the eye are referred to and a detailed description of their salient characteristics is presented. The eye is most commonly injured by an accidental projection of the caterpillar into it. The authors discount the suggestion of Wagenmann that the hairs may be blown into the eye by the wind. The nature of the caterpillar hairs and the mechanism by which they are able to pentrate the conjunctiva and cornea are described in considerable detail. The toxic properties of the body fluids of the caterpillar and the part these fluids play in the production of the inflammatory reactions are also described. The pathologic changes resemble those seen in tuberculosis. The authors review the work of Redslob and reproduce some of his photomicrographs. As a result of some experimental work in rabbits they are able to show the

successive stages of the disease by multiple biopsy. The changes in rabbits are similar to those which occur in man with the exception that they are much more rapid and superficial.

The symptoms are described in some detail. It is only in the later stages that nodules appear in the conjunctiva, the nodules from which the designation "ophthalmia nodosa" arose. The earliest stages present an urticarial type of edema of the lids and conjunctiva with multiple minute erosions of the cornea. The condition is painful. The importance of biomicroscopic examination is emphasized. When the disease is produced by tissue fluids of the caterpillar, as has been reported, it is milder and of shorter duration. In arriving at a diagnosis the points of greatest importance are the history, the recognition of a latent period, the intensity of the subjective symptoms, the keratitis with infiltration, especially when the injury is due to the liquid virus, the conjunctival nodules and the biomicroscopic examination by means of which the hairs can be found. The condition must be differentiated from other acute inflammations of the conjunctiva, tuberculosis, etc. The disease varies greatly in duration and severity. Treatment should be preventive and curative. When the disease is acute, the conjunctiva should be freely irrigated and the hairs removed. The removal of hairs is best done under the corneal microscope and is a protracted and tiring procedure. Further treatment is symptomatic. When nodules develop they should be removed surgically. A complete bibliography is appended.

S. B. MARLOW.

Comparative Ophthalmology

THE PHENOMENAL VISUAL ACUITIES OF THE EUROPEAN CHIMNEY SWALLOW. S. HOLTH, Brit. J. Ophth. **18:** 703 (Dec.) 1934.

Holth has "convinced himself that the *Hirundo rustica* has phenomenally sharp vision both for far and short distances. In bright sunshine the swallows hunted tiny insects—mostly the common midge, *Culex pipiens*—very high up in the air, and often in full speed changed the direction in acute angles. Suddenly one of them from at least 20 metres height became interested in my little dry fly 'Black Gnat" on 000 'Hardy' hook during trout fishing and rushed down to it; but in about one metre's distance from the dry fly the swallow stopped abruptly with the wings transversally; he observed with his temporal foveae perhaps the little hook . . . but certainly the hairfine (0.006) undyed transparent drawn gut cast, which he had never seen connected with any living insect; with his nasal fovea he had monocularly detected the fly itself from at least the distance of 20 metres."

W. ZENTMAYER.

Congenital Anomalies

BENIGN CONGENITAL MELANOSIS OF THE EYE. J. FRANÇOIS, Arch. d'opht. **51:** 689 (Nov.) and 775 (Dec.) 1934.

Desmarres first described this rare condition in 1847. To date one hundred cases have been recorded in the literature. François presents brief abstracts of the reports in chronological order. He then describes and illustrates with striking colored plates three new cases; in two the

condition was unilateral, and in one, bilateral. The principal symptoms of this condition are pigmentation of the sclera and increased pigmentation of the iris and fundus. The various types of scleral pigmentation are described from the standpoint of the cases which have been reported. The increases in the pigment of the iris and fundus are dealt with in a similar way. Secondary symptoms include pigmentation of the cornea, papilla, conjunctiva, lids, skin and hair. In only a few instances have other congenital anomalies been observed. These, he feels, have been merely coincident. The patients are free from functional disturbances since there are no changes in the visual acuity, field of vision, light sense or color sense. In the differential diagnosis this condition must be distinguished from pathologic coloration of the sclera and pathologic pigmentation. These disorders are briefly described. The pathology is systematically reviewed, and the hereditary and congenital nature of the condition considered. The literature offers little evidence as to whether the pigmentation progresses or remains stationary. It appears rarely to have increased. The question of malignant degeneration is most important. Since sarcoma most commonly arises from the heavily pigmented structures of the eye, such pigmentation must be admitted to have some influence on the development of a tumor. On the other hand this tendency must not be exaggerated, as the number of cases of sarcoma developing in a melanotic eye is very limited. A further consideration is that those who have reported on large numbers of melanosarcomas have only exceptionally found it accompanied by abnormal ocular pigmentation. A complete bibliography of this subject is appended.

S. B. MARLOW.

ARACHNODACTYLIA AND SUBLUXATION OF THE LENS: OBSERVATIONS IN ONE FAMILY. H. VILLARD, H. VIALLEFONT and J. TEMPLE, Bull. Soc. d'opht. de Paris, July 1934, p. 384.

The family described consisted of the father, the mother and five children. The father and the first, the second and the fourth child had congenital ectopia lentis, the lenses being dislocated above and laterally. The first and the second child had arachnodactylia. The lenses of the children were normal, but those of the father showed peripheral opacities under the anterior cortex. The authors were unable to trace the father's family tree, as he had entirely separated himself from all the other members. There were no traceable stigmas in the mother's antecedents. General examination of every member of the family failed to reveal any outstanding finding. Pictures and drawings accompany the article.

L. L. MAYER.

A CASE OF NASAL ECTASIA OF THE FUNDUS WITH SUPERIOR AND INFERIOR CONUS. WALTHER LÖHLEIN, Klin. Monatsbl. f. Augenh. **93**: 439 (Oct.) 1934.

A woman, aged 31, had myopic eyes with greatly elongated axes. Her right eye presented a myopia of 22 diopters with annular staphyloma, ectasia of the area of the macula and amblyopia since childhood. Her left eye had good vision until a few months prior to observation by Löhlein, when straight lines appeared wavy. The patient feared that

a detachment of the retina had occurred. The fundus of the left eye presented a peculiar condition, which is minutely described, and the description is illustrated with a drawing and two photographs. The macular area showed only 2 diopters of myopia, but the nasal portion of the fundus was ectatic with a myopia of 14 diopters. The occurrence of an ectasia at the nasal side of the fundus was due to superior and inferior conus and to the vessels, entering the globe in an inverted direction, that is, in a medial direction. The descriptions of this phenomenon by E. Fuchs and von Szily Sr. and the embryologic research on it by von Szily Jr. are cited. Löhlein discusses the occurrence of upward and downward conus with inverted direction of the retinal vessels. Confusion of the condition with detachment of the retina is possible, and another oculist diagnosed retinal detachment later on, when vision had grown weaker. It had dropped from 5/7 to 5/50 of the normal when Löhlein had an opportunity to reexamine the patient a year after the first examination. This deterioration was not due to an increase of the ectasia but to an infection of the depigmented and congenitally inferior, weak portion of the fundus. Sinusitis and chronic tonsillitis were considered as sources of the infection. Symptomatic treatment resulted in restitution of the vision to 5/7 of the normal. This case furnished proof (1) that the location of an ectasia of part of the fundus is less dependent on the location of the conus than on the direction in which the funnel of the vessels opens; (2) that congenital inferiority of the sclera of the eye predisposes to progress of the destruction by stretching, as in the myopic ectasia in the temporal portion of the fundus; (3) that in congenitally abnormal eyes with a high degree of myopia the resistance of the tissues to incidental infectious diseases is diminished to some degree.

K. L. STOLL.

Cornea and Sclera

KERATITIS NUMMULARIS DIMMER: CASE REPORT. W. Y. CHEN, Chinese M. J. **48:** 890, 1934.

A typical case of keratitis nummularis is reported for the first time in China. A photograph and drawings of the corneas are given.

O. P. PERKINS.

AN UNUSUAL FORM OF MARGINAL KERATITIS. KUNITOMO, Acta soc. ophth. jap. **38:** 157 (Dec.) 1934.

Ten cases of a variety of marginal keratitis are reported, with a study of the literature. Kunitomo suggests the name of miliary marginal keratitis because small round yellowish-gray infiltrates appear at the margin of the cornea within 1 or 2 mm. of the limbus. The condition is usually observed in adults between 25 and 35 years of age. The onset is sudden, and both eyes are affected, with moderate symptoms of irritation. The margins of the infiltrations are sharply defined, and they sometimes project above the surface of the cornea. There is little tendency for these infiltrations to extend, and after absorption they leave only the faintest scar. The bulbar conjunctiva is injected as in episcleritis, and occasionally nodules are visible. The corneal endothelium is not affected.

Phlyctenae, nodules and tuberculous infiltrations of the cornea sometimes accompany this picture. The cause is to be found in tuberculous allergy. The prognosis is favorable.

A. KNAPP.

Experimental Pathology

THE INDEX OF REFRACTION OF THE AQUEOUS AND THE CALCIUM CONTENT OF THE VITREOUS IN PARATHYROIDECTOMIZED RABBITS. G. BORSELLINO, Arch. di ottal. **41:** 293 (Dec.) 1934.

Of fourteen rabbits from which two, three or four parathyroid glands had been removed, six lived long enough to be used for this study. An equal number of healthy rabbits were killed and examined as controls. The two series showed no differences in the index of refraction of the aqueous. The parathyroidectomized animals, however, showed a marked decrease in the calcium content of the vitreous, averaging 0.067 mg. per gram as against 0.090 mg. per gram in the normal animals. (The calcium content of the blood of these animals is not given, but it is known to be reduced following parathyroidectomy.)

S. R. GIFFORD.

General Diseases

DISTURBANCES OF THE VISUAL APPARATUS IN THE TOXEMIAS OF PREGNANCY ASSOCIATED WITH ECLAMPSIA OR THE PRE-ECLAMPTIC STATE. R. E. WRIGHT, K. KOMAN NAYAR and T. VENCATARANGUM NAYUDU, Brit. J. Ophth. **19:** 19 (Jan.) 1935.

A rapid loss of vision to perception of hand movements, accompanied by convulsions, followed delivery in a healthy woman of 18 years with normal ocular fundi. A lesion of the upper neuron attributable to eclampsia was diagnosed. The woman later gave birth to a second child, but no change in vision occurred.

A tabulated study of twenty-eight cases of eclampsia or preeclampsia in which the eyes were examined is given. From this study the authors conclude:

1. Practical blindness associated with normal eyegrounds may follow the eclamptic state, the presumption being that the injury has acted at a higher level than the third neuron. This is exceedingly rare in Madras, only one other possible case having been observed in the last fifteen years.

2. Loss of vision may also result from an injury acting at the retinal level either suddenly (and then vision is usually recovered in whole or in part) or gradually (in which case the loss is permanent, owing to late changes in the vessels); this is not very rare.

3. Minor injuries may take place involving the retinal vessels, as evidenced by hemorrhages, edema and alteration in the caliber of arteries and veins, without immediate interference with vision; such injuries are relatively common.

4. The lesser spastic phenomena of the arteriolar tree described in recent years were probably missed, owing to the hurried nature of the ophthalmoscopic observation, rather than absent on account of any peculiarity in the local conditions.

5. Detachment of the retina as a sequel to the toxemias of pregnancy is probably very rare in Madras; it has not been observed in this condition by the authors either in the present series or on any previous occasion in the past ten years.

W. ZENTMAYER.

IMPROVEMENT IN THE CARE OF TUBERCULOUS DISEASE OF THE EYE. J. URBÁNEK, Wien. klin. Wchnschr. **47:** 1490 (Dec. 7) 1934.

The important criterion for a satisfactory result is the exact diagnosis. To arrive at it is often not possible in cases of disease of the eye, as the medical consultant finds little or no evidence of active pulmonary involvement. Usually the lungs show an interstitial form of tuberculosis with small nodules, so-called "miliaris discreta," or a postpleuritic fibrosis and a residual tuberculous pleuritis (*pleurite à répétition*) with a tendency to hematogenous bacillemia. The finding of the bacilli in the blood stream plays the most important rôle in the diagnosis of lesions of the uvea. Because blood cultures have been found positive there is no longer any doubt that inflammatory reactions in the eye are at times due to blood-borne organisms. When roentgenologic and cultural evidence is lacking, intracutaneous or subcutaneous injection of tuberculin preparations is the only method remaining to clinch the diagnosis. Previously Koch's old tuberculin was used subcutaneously. Urbánek has for some years used a method based on that of Mantoux, employing a tuberculin preparation. By comparable experiments he has demonstrated that the allergic phenomenon which at times is so characteristic a reaction to the old tuberculin is also found when a tuberculin preparation is injected. The procedure with this preparation is as follows:

1. The patient remains in bed for two days. The temperature is taken every two hours.

2. Early on the third day an intracutaneous injection of 0.2 cc. of 0.25 per cent phenol is given. This is a control to eliminate any reaction to the phenol which is used in making the tuberculin preparation.

3. On the following day, if the control is negative, 0.2 cc. of 1,000,000 mg., 0.2 cc. of 100,000 mg. and 0.2 cc. of 10,000 mg. of the tuberculin preparation are injected.

4. Two days are allowed in which to watch these reactions: (*a*) The temperature is checked. (*b*) Any general reaction is noted.

5. If the reactions are negative, the following doses are given: 0.2 cc. of 10,000 mg. and 0.2 cc. of 1,000 mg. of tuberculin preparation. In response to the last injection, there is usually an infiltration of the skin from 3 to 5 cm. in diameter, together with a slight focal reaction and a rise in temperature.

6. If there is no reaction after forty-eight hours, 0.2 cc. of 1,000 and 0.2 cc. of 100 mg. of the tuberculin preparation are injected.

No larger concentration is given, as general reactions are sometimes very severe following the use of such concentrations. A theory of allergy is given.

In a series of 150 patients with chronic iridocyclitis, Urbánek has had good results from the use of a tuberculous vaccine known as AO, made by the firm of Arima.

The reaction in sympathetic ophthalmia is considered by Urbánek as an anaphylactic phenomenon, and he reports excellent results in this condition from the use of the tubercle vaccine. A bibliography is added to the article.

L. L. MAYER.

General Pathology

A NOTE ON THE FIXATION OF SPECIMENS FOR CELLOIDIN SECTIONING. W. A. GRAY, Brit. J. Ophth. **19:** 47 (Jan.) 1935.

Gray has found that using alcohol as a fixative gives the best section. The method employed is as follows: (1) fixation for twenty-four hours in 30 per cent alcohol in distilled water; (2) fixation in an alcohol series in which the percentage of alcohol is increased daily by 2 per cent up to absolute; (3) opening of the eyeball at the corneosclerotic junction and further treatment in absolute alcohol for twenty-four hours.

Three years' use of this method, he states, has given consistently good results.

W. ZENTMAYER.

PATHOLOGIC ANATOMY OF ALBUMINURIC NEURORETINITIS: REPORT OF A CASE. E. WÖLFFLIN, Klin. Monatsbl. f. Augenh. **93:** 446 (Oct.) 1934.

A man, aged 58, with chronic nephritis and alcoholism, noticed severe failure of vision for a year prior to observation. The disks were congested; numerous retinal hemorrhages and white foci were noticed, but no star shaped figure. Later on, increase of the white foci obscured the view of the left disk. The retinal veins were but slightly distended. The pathologic changes in the globes are described and discussed in detail.

The presence of many large cysts in the retina is explained as resulting from chronic and extensive hypertension of the arteries. These cysts resembled the vacuoles of Iwanov, and were deemed to be outgrowths of physiologic degeneration, which occurred simultaneously. Glaucoma did not develop as a result of the hypertension in the retinal arteries because, in Wölfflin's opinion, the affluent equaled the defluent flow. In this connection, he puts the question: Why is edema of the retina never observed in glaucoma with high tension? Simple hypertony of the central retinal artery cannot produce glaucoma unless other changes, such as atrophy of the iris and obliteration of the angle of the chamber, obstruct the defluent flow. Hence glaucoma is never found with albuminuric retinitis except as a rare complication. The white foci in the retina, according to Wölfflin, represent an extensive edema and also proliferations of the neuroglia or accumulations of lipoid substances, varicose degenerations of the nerve fibers and occasionally deposits of fibrin. The hypertrophies in the retina and choroid are considered as a result of the increased arterial pressure. The retinal cysts contained either a transparent liquid or a very fine network. Fibers of the latter could be followed into the retinal tissue, suggesting that they were remnants of the intergranular layer. A peculiar misplacement of the layers of the retina and distinct hypertrophy of the neuroglia on the left disk may have been caused by inflammatory or toxic processes.

K. L. STOLL.

Injuries

TRAUMATIC MYOPIA. M. BOLOTTE, Arch. d'opht. **51:** 662 (Oct.) 1934.

Bolotte observed the development of a myopia of 1.25 diopters following a contusion. The myopia lasted a month. Under the influence of atropine a hyperopia of 1 diopter was found. Traumatic myopia usually follows injuries of moderate intensity and becomes manifest after the edema and ecchymoses have cleared. No organic lesions are discoverable in the eye. The myopia is transitory and variable in duration. It is seldom as much as 5 diopters. It may be due to subluxation of the lens, and then is permanent. The most common explanation is that it is due to spasm of the muscles of accommodation. Bolotte does not feel that this explanation is completely satisfactory. He invokes the theory of accommodation suggested by Hudelo. This theory devides the ciliary muscle into two parts: (1) the radial fibers which have to do with accommodation for distance and (2) the circular fibers which have to do with accommodation for near. This mechanism is briefly reviewed. He contends that it is more reasonable to suppose that a contusion will result in paralysis rather than in spasm. To explain the cases of mild traumatic myopia he suggests that there may be tears or hemorrhages in the radial part of the muscle, which is more exposed to injury, and that the myopia is due to the resulting unbalanced action of the ciliary muscle. The disappearance of the myopia under atropine he explains by the paralysis of the radial and circular fibers so that a strong muscle no longer acts against a weak.

S. B. MARLOW.

Lacrimal Apparatus

"BLOODY TEARS." C. DÉJEAN, Arch. Soc. d. sc. méd. et biol. de Montpellier **15:** 468, 1934.

The spontaneous periodic flow of "bloody tears" without apparent local cause has been occasionally observed by physicians since the seventeenth century. Gabrielidès in 1923 collected eighteen cases. The blood is not derived from the lacrimal apparatus, as was once believed, but exudes from fine conjunctival vessels.

In Déjean's patient, a girl of 11, blood was observed sporadically to fill the culdesac of the left eye, flow over the cheek and after a few minutes stop spontaneously. No rupture of conjunctival vessels could be detected; it seemed as if the vessels just became suddenly dilated and permeable. Later occurred also recurrent epistaxis, hemorrhage from the gums and subcutaneous ecchymoses. Since the conjunctival hemorrhages ceased permanently after the girl's first menstruation at 13, the "bloody tears" in this case probably represented a vicarious menstruation. In other cases, such as those of hysteria, the vasomotor changes may have been precipitated by similarly acting hormonic or sympathetic crises.

J. E. LEBENSOHN.

DISTURBANCES OF THE LACRIMAL CANAL AND THEIR TREATMENT. A. VOGT, Schweiz. med. Wchnschr. **64:** 1107 (Dec. 8) 1934.

Vogt concerns himself with the many phases of this subject. The diagnosis is not always easy. Tearing may be due to an obstruction

of the canal or to hypersecretion of the lacrimal gland. It may also be entirely on a psychic basis. A case is cited. A 1 per cent fluorescein solution dropped into the conjunctival sac should make its exit from the nose in five minutes. If it does not, the canal is not functioning properly. Sterile salt solution is recommended for irrigating the canal. If salt solution fails to come through, Vogt uses purified liquid paraffin or sterile olive oil. No untoward results have occurred from the use of these preparations. Slitting of the canaliculus is not to be considered, as it distorts the normal physiology of the mechanism. The use of sounds, especially those of the large type, is not recommended, because of the possibility of making a false passage. Twenty-five per cent mild silver protein has given the best results in Vogt's hands in the irrigation of the infected canal. Injection of 2 per cent methylthionine chloride gives good orientation of the sac and the canal. In the atresia of the new-born the occlusion should be removed by a sound before the third week to prevent further complications. As to the etiology of the condition Vogt believes that this is as yet in the dark but cites his own family as showing that a predisposition may exist. Tuberculosis, syphilis and traumatic lesions affecting the canal are considered.

L. L. MAYER.

Lens

CATARACT AMONG THE CHINESE. H. T. PI, Chinese M. J. **48:** 928, 1934.

This is a statistical study of cataract as found in patients during a four year period at the clinic of the Peiping Medical College. Among 12,111 ophthalmic patients, 295 cataracts were found. Of these only 80 were of the senile variety. This low incidence is explained by the early age at which the people die, by their conservatism regarding modern treatment and by their psychology in regard to old age. One hundred and twenty-four cataracts were complicated, the most frequently found complications being glaucoma, iridocyclitis, adherent leukoma, high myopia and retinal detachment. Forty-one cataracts were traumatic. Twenty-nine were congenital. Only 6 were thought to be due to diabetes, and only 1 to tetany. Fourteen cases were unclassified.

O. P. PERKINS.

ELECTROSURGERY OF THE LENS. A. MOREY, Arch. de oftal. hispano-am. **34:** 537 (Oct.) 1934.

After reference to the independent original work on this subject by Lacarrère and Jess, Morey reports his experiments and later experience in connection with electrodiaphakia. He prefers Lacarrère's instrument, which he has slightly modified, but he uses a 150 ma. current without a condenser. After the usual preliminaries and with cocaine anesthesia and euphthalmine dilatation an incision is made with a lance knife. This incision is enlarged with the scissors to over one-half the corneal circumference. The flap is everted with a forceps, and the instrument is applied to the anterior surface of the lens. The button is pressed which ejects the threadlike electrodes. The current is then opened, and the lens is extracted with aid of slight pressure at the inferior corneal margin.

C. E. FINLAY.

Lids

PHTHIRIASIS CILORUM. B. Y. PARANJPE, M. Digest 2:96 (Sept.) 1934.

The author has found the aforenamed condition in 5 of a total of 1,720 patients. All 5 patients were over 20 years of age. None of them came from the slums. Study by means of the slit lamp revealed both lice and nits on the lashes. In 3 cases the lice were found to be of the variety known as pediculosis pubis. For treatment, the lashes were cleansed with a 3 per cent solution of sodium bicarbonate. Ointment of mercuric nitrate dilutum (British Pharmacopeia) was thoroughly rubbed into the roots of the lashes at night and washed away with soft soap in the morning. This treatment was continued for a week. Zinc oxide ointment with sulphonated bitumen was used for the eczema of the lid margins. To prevent reinfection, the source of the infection (head, armpits or pubic region) was treated also.

W. F. DUGGAN.

Methods of Examination

THE ZONULE OF THE POSTERIOR LENS OF THE NORMAL EYE UNDER THE OPHTHALMOSCOPE. N. G. TRANTAS, Bull. Soc. d'opht. de Paris, July 1934, p. 380.

Two and one-half years ago Trantas presented before the Greek Society of Ophthalmology the possibility of examining the zonular fibers of the normal eye with the ophthalmoscope without the aid of a coloboma of the iris or a dislocation of the lens. To examine the fibers, the observer has the patient turn the eye laterally as far as possible, and places the ophthalmoscope on the opposite side of the eye. An electric instrument with a + 12 to + 20 diopter lens is used. With the eye turned, the observer sees the periphery of the lens at the equator and some millimeters back. Fine radial lines, parallel, brilliant and the color of white gold are seen connecting the zonule and the posterior lens. Pressure on the globe causes the fibers to change their direction. An injection of homatropine makes the examination easier. The observer looks past the portion of the field illuminated by the ophthalmoscope. In cats, not only the zonule but the tapetum is readily observed. In iridocyclitis of the chronic type one sees a blackish "salting" of the fibers, which diminishes as the disease subsides. In absolute glaucoma the fibers are black. In hemophthalmus, after absorption, one sees a "salting" of the zonule.

The article is illustrated with a photograph.

L. L. MAYER.

HYALOSCOPY. F. POYALES, Arch. de oftal. hispano-am. 34:476 (Sept.) 1934.

This is a report on the alterations in the hyaloid membrane after various methods of cataract extraction as viewed by the author's method of hyaloscopy. Hyaloscopy consists in the substitution of the slit of the Gullstrand lamp by a slit in the form of a cross, which projects on the eye a luminous image in the form of a cross that in traversing the transparent mediums of the eye gives three images: one on the cornea, one on the iris and one on the hyaloid membrane.

Observations were made on 794 patients from 1932 to 1934; 418 had a modified Smith extraction, 106 a Barraquer extraction, 112 extraction with the Kalt forceps and 154 extracapsular extraction.

Poyales' conclusions are: 1. The Barraquer operation furnishes a greater proportion of hemispheric hyaloid membranes (perfect results) but shows a greater proportion of prolapses of the vitreous. 2. The modified Smith operation shows a greater proportion of hyaloid deformations with a minor proportion of prolapses of the vitreous. 3. The extraction with the Kalt forceps occupies a position in respect to the aforementioned features midway between the Smith and Barraquer operations, but shows a greater proportion of capsular ruptures. 4. In some cases late reductions of vision are due to late ruptures of the hyaloid membrane following some traumatism.

Poyales reports three cases of late opacification of the hyaloid membrane due to vitreous sclerosis.

C. E. FINLAY.

Neurology

SYRINGOMYELIA AND NEUROPARALYTIC KERATITIS. J. M. HÖHR CASTAN, Arch. de oftal. hispano-am. **34:** 419 (Aug.) 1934.

In connection with a case of neuroparalytic keratitis in the course of syringomyelia with cervical extension and marked sympathetic involvement, Castan discusses at length the question of the etiology of neuroparalytic keratitis and the relative infrequency of cases dependent on sympathetic lesions. Reference is made to the few cases reported in connection with syringomyelia. In the reported case it was of interest to determine whether the syringomyelia had any direct influence on the production of the keratitis or whether the corneal lesion was due to secondary sympathetic involvement. He inclines to the view that there was a connection with pronounced trophic vasomotor disturbances brought about by a unilateral lesion of the sympathetic nerve. Höhr Castan reviews the modern literature at length.

C. E. FINLAY.

SEVERE LOSS OF VISION IN PREGNANCY FROM A CHIASMAL LESION. G. PERÉMY, Klin. Wchnschr. **13:** 1505 (Oct. 20) 1934.

A woman 40 years of age had had mild frontal headaches. The menstrual history was normal. She had had three previous pregnancies. For six years she had realized that she was unable to see with the right eye. During the last previous pregnancy she had noted that vision with the left eye was slightly impaired. During the past four months of the present pregnancy vision had failed materially. A complete examination gave negative results except for the following observations: The right pupil was widely dilated, with no reaction to light; there was simple atrophy of the right optic nerve; visual acuity with the left eye was perception of fingers at 2 meters; the left disk was hyperemic; the visual field for white was reduced; that for red was markedly reduced; there were absolute central scotomas for color; there was strabismus divergens ex amaurosi. The patient was unwilling to have the pregnancy terminated. One month later she consented. She was

recalled for examination two and one-half years later, at which time she had no complaints, and the physical examination, roentgen examination and laboratory tests again gave negative results. The visual acuity with the left eye was 5/10; the disk was pale; there was temporal hemianopia but no central scotomas for color. Perémy reviews the literature, beginning with the report of Erdheim and Stumme, and questions whether an increase in the size of the pituitary gland can account for the tremendous destruction in this case.

L. L. MAYER.

RECKLINGHAUSEN'S DISEASE IN OPHTHALMOLOGY. H. KROTKOFF, K. GOLUBEVA and S. FILATOV, Sovet. vestnik oftal. **5:** 248, 1934.

A general examination of the patient is important for a correct diagnosis of Recklinghausen's disease. Two cases are reported.

CASE 1.—A man, aged 29, suffering from epilepsy, had general neurofibromatosis. There were 255 nodules and pigmented moles situated mostly on the chest, abdomen, buttocks and upper extremities. The size of the nodules varied from that of a pinhead to that of a large tumor 14 by 9 cm. There were three nodules on the right upper lid, 3 by 4 cm. in diameter, of a typical coffee and milk color. The patient died during an epileptic attack. The autopsy showed degeneration of the heart muscle, enlargement of the spleen and nephrosclerosis. The histologic examination of a cutaneous nodule showed extensive fibromatous growths. On the slides stained by Weigert's method, nerve fibers were seen in the skin; some had lost the myelin sheath; some were atrophic. At places there was abundant cellular tissue with oblong or oval nuclei.

CASE 2.—A boy, aged 12, had a diffuse tumor of the right upper lid and temple. The upper lid was thickened, and the tumor covered the palpebral tissue. The eye and orbit were normal. The lid remained ptosed after the operation for removal of the tumor. Under the microscope there were found, as in the first case, nerve fibers. There was an abundance of connective tissue. Palisading of the nuclei was observed, indicating that the origin of the tissue was Schwann's membrane; it also was stained yellow by Van Gieson's method.

The etiology of Recklinghausen's disease is discussed. The difficulty of the diagnosis is demonstrated in their reports of two more cases in which the condition was clinically diagnosed as Recklinghausen's disease but under the microscope proved to be simple fibromatosis.

O. SITCHEVSKA.

Orbit, Eyeball and Accessory Sinuses

CLINICAL AND PATHOLOGIC STUDY OF SUPPURATIVE PHLEBITIS OF THE CAVERNOUS SINUS. H. ISMAÏL, Ann. d'ocul. **171:** 814 (Oct.) 1934.

Phlebitis of the orbital veins and the cavernous sinus is a possible complication in all infections of the face and scalp. Without denying the possibility of thrombophlebitis, Ismail states that the lesion which he has always met with is suppurating phlebitis. He has not found a

case in which thrombophlebitis was diagnosed and verified at autopsy. This study has been done principally to distinguish between two expressions with two entities clearly defined.

The prognosis of orbitocavernous phlebitis is extremely grave. According to statistics, the percentage of cures does not rise above 5 to 7. It is possible that the cases in which the condition was cured were instances of thrombophlebitis.

The differentiation between thrombophlebitis and suppurating phlebitis has not been established as yet. The author has tried to suggest theoretically symptoms which might assist in this differentiation.

The treatment must be, above all, prophylactic. A knowledge of the possibility of venous complications should help in preventing the danger of all infections of this region, particularly of the face. The treatment is palliative and symptomatic. Eagleton alone attempted surgical measures directed to the cavernous sinus. He seems to have obtained three cures in twenty-four patients treated.

S. H. McKee.

Pharmacology

Effect of Acetylcholine in Emmetropia, Ametropia and Aphakia. G. Possenti, Ann. di ottal. e clin. ocul. **62:** 529 (July) 1934.

Possenti reviewed previous literature dealing with the use of acetylcholine, chiefly for its effect as a vasodilator. He investigated its effect on the accommodation in various conditions of refraction, making careful estimations before and after subcutaneous injection of the drug. Nine emmetropes, five presbyopes, twenty-nine myopes, twelve hyperopes and twenty persons with astigmatism were examined, also thirteen persons with aphakia. After the administration of acetylcholine, most of the patients showed a slight but definite improvement of vision and a recession of the near point, often of from 2 to 3 cm. The improvement in vision was more marked in the myopes, while the near point was most affected in the hyperopes. The improvement in vision may be in part attributed to vasodilatation affecting the retinal vessels and hence improving retinal function. It seems to Possenti that the relaxation of accommodation undoubtedly produced by the drug, as shown by recession of the near point, is equally important in improving vision, especially in the myopes. The drug apparently affects spasm of the ciliary muscle as well as vascular spasm. In aphakia the effects observed are to be explained, he believes, by better nutrition of the retina due to vasodilatation and to an actual pushing forward of the retina by dilatation of its own vessels or those of the choroid. Improvement in vision in a certain number of myopes following a course of injections of acetylcholine appeared to remain after the drug was discontinued, suggesting that the accommodative spasm was permanently relieved. A bibliography is given.

S. R. Gifford.

EFFECT OF TESTICULAR EXTRACT ON THE PENETRATION OF FLUORESCEIN AND CERTAIN DRUGS INTO THE EYE. G. ROSSI, Arch. di ottal. **41:** 331 (Dec.) 1934.

Literature is reviewed indicating that certain glandular extracts, especially testicular extract, increase cellular permeability. Extracts of rabbit testicles prepared by Rossi and a commercial product, endospermin, were employed. When injected subconjunctivally into rabbits or used for immersion of freshly enucleated eyes of frogs, the extracts produced miosis and, in the rabbits marked hyperemia and chemosis. The miosis was moderate, lasting only from four to six hours, and was overcome by the simultaneous use of epinephrine. When fluorescein was injected subconjunctivally, the simultaneous injection of testicular extract delayed its passage and reduced the amount of fluorescein reaching the anterior chamber. The extract was found to inhibit the effects of epinephrine and of atropine in the rabbit, while in the frog some evidence was found of an increase in the effect of these drugs after the use of testicular extract. The miotics were aided in their effect by the extract.

These somewhat contradictory results may depend on factors other than permeability, such as the hyperemia and chemosis produced by the drug, but Rossi believes that, in frogs' eyes at least, an increase in permeability is probably produced.

S. R. GIFFORD.

The Pupil

PUPILLOSCOPY AND ADAPTOMETRY. G. LODATO, Arch. di ottal. **41:** 306 (Dec.) 1934.

Lodato compared the pupillary reactions to differences in light stimulus with the condition of the retina as shown in various states of adaptation. The Sander differential pupilloscope was used for the former, and Nagel's adaptometer for the latter. Fifty-four subjects were employed. In the normal groups there were some variations, adaptation being in some cases reduced while pupillary reactions were normal. In myopia with lesions of the fundus adaptation was reduced considerably while pupillary reactions remained normal. In a case of amblyopia caused by quinine and one of icterus with hemeralopia normal pupillary reactions were present while adaptation was very low. In two persons with unilateral macular lesions adaptation was, as might be expected, normal, and the pupillometric reaction in the affected eye showed no significant reduction. This is not in agreement with the general opinion that macular changes affect especially the pupillomotor reactions. Among six cases of retinitis pigmentosa with marked reduction in adaptation the pupillary reactions were normal in all but one eye, an eye with strabismus and markedly reduced vision. Among twenty-two syphilitic persons without ocular lesions, pupillary reactions were usually normal, while adaptation tended to be near the lower limits of normal.

The lack of any relation between the sensitivity of the retina to light during dark adaptation and the pupillomotor response offers evidence, Lodato thinks, in support of the theory that special fibers mediate the pupillary reaction but do not transmit visual stimuli.

S. R. GIFFORD.

A Critical Review of "Reflex Pupillary Paralysis." L. Roemheld, Deutsche med. Wchnschr. **60:** 1541 (Oct. 12) 1934.

Nonne described the Argyll Robertson pupil as pathognomonic for syphilis. In Erb's recent statistics concerning cases of tabes, trauma was given as the cause in 0.3 per cent. Under present conditions, with the enormous number of automobile accidents, Roemheld believes that a metatraumatic pseudotabes or a pseudoreflex pupillary paralysis is wont to occur often following cranial injury.

He reviews two cases of injury incurred in the war, reported by him in the *Deutsche Zeitschrift für Nervenheilkunde*, in 1917, in which cranial injury with suspected multiple hemorrhages caused reflex pupillary paralysis. Symptoms and signs of syphilis were entirely lacking. Cases of reflex pupillary paralysis have been reported following encephalitis and alcoholism. A detailed report of a case following a skull fracture sustained in an automobile accident is given. Behr's criteria for the Argyll Robertson pupil are given. The true reflex pupillary paralysis is supranuclear and denotes syphilis, while the traumatic pseudoreflex pupillary paralysis is due to an injury to the oculomotor nucleus.

L. L. Mayer.

Physiology

Critical Values for the Light Minimum and for the Amount and Rapidity of Dark Adaptation. C. E. Ferree, G. Rand and M. R. Stoll, Brit. J. Ophth. **18:** 673 (Dec.) 1934.

The authors' summary is as follows:

"In the foregoing paper the light sense and the amount and rapidity of dark adaptation are studied in relation to the needs and requirements in clinical work. Values are given for the light minimum on 206 eyes at ages ranging from 9 to 70 years, 114 males and 92 females. Determinations were made at the end of a standardized period of light adaptation and after 1, 2, 5, 10, 15 and 20 minutes of dark adaptation. Curves were plotted to show the distribution and range of scatter of the results obtained and a brief statistical treatment is given to bring out points of interest and value in diagnosis.

"For the purpose of determining norms for clinical use the observers were divided into two groups—those under and those over 35 years of age. The 5 percentile values were selected as critical or borderline, and were plotted in the form of a curve to be used as a standard in the examination of new cases. Two record sheets are shown, one for each of the age groups, on which this curve was plotted and in addition two other curves, representing respectively the median and the 95 percentile values, in order better to aid in the orientation of the results of any new case examined in relation to those obtained from a group of non-pathologic cases. These record sheets should be supplied with the instrument used for making the test."

W. Zentmayer.

Topographic Study of Retinal Sensitivity by Means of the Pupillary Reaction to Light. A. Biffis, Ann. di ottal. e clin. ocul. **62:** 665 (Aug.) 1934.

Biffis attempted to investigate further the much debated question of the area of retina which mediates the reaction to light. For observation

he employed the corneal microscope with a micrometer ocular, so that the pupil could be measured exactly. A constant light was focused so as to give a small bundle of parallel rays which were deflected by Nicoll prisms so as to meet 15 mm. behind the corneal vertex. The illuminating system was movable on an arc graduated so that the angle of incidence could be varied within accurate limits. The light difference which was necessary to elicit a pupillary response was measured by the rotation of Nicoll prisms. Fixation was made on a light so indistinct as not to produce any reaction of accommodation. The eye not under observation was securely closed. As subjects he selected patients with central scotoma and reduced the central vision of such subjects further by dazzling. The area so affected was varied by increasing the size of the diaphragm through which the light was admitted, the use of this light being continued for ten minutes. In the eight subjects employed, illumination of the central area elicited a reaction to the light even after dazzling provided a strong enough light stimulus was employed. More peripheral areas reacted with a less strong stimulus, which proved that the reaction produced was not due to diffusion of light into the central area. While increasing stimuli were necessary in the more peripheral areas, it could be determined with certainty that even outside an angle of 43° 60′10″ there were still retinal elements capable of eliciting a pupillary response. No differences were noted between the nasal and temporal sides. The intensities of light necessary to elicit a pupillary response in the various zones of the retina are given. A bibliography is given.

S. R. GIFFORD.

THE QUESTION OF THE INFLUENCE OF THE MELANOPHORE HORMONE ON THE DARK ADAPTATION OF HUMAN EYES. W. BUSCHKE, Klin. Wchnschr. **13:** 1785 (Dec. 15) 1934.

Jores and Jores and Velde demonstrated that the melanophore hormone from the hypophysis, when dropped into the conjunctival sac, causes a shortening of the time of dark adaptation. The rationale for this result was the hypothesis that by absorption the hormone acted on the visual purple as a catalyst. Buschke secured some of the hormone from Jores and attempted to reproduce the latter's experiments. Instead of using the Birch-Hirschfeld adaptometer as Jores had done, he used the Nagel instrument. Using the same technic as Jores, he was unable to find any change in the dark adaptation of the experimental and the control eye. In addition, he injected 0.2 cm. of the hormone subconjunctivally. There was no change in dark adaptation even with this method. His technic is outlined. The importance of the finding of a substance that would influence the visual purple is emphasized. Buschke was unable to confirm the work of Jores. One chart is given in illustration of the article.

L. L. MAYER.

Refraction and Accommodation

INTRODUCTION TO THE STUDY OF MYOPIA AND MYOPIC CHORIORETINITIS: RÉSUMÉ OF THE REPORT. J. MAWAS, Bull. Soc. d'opht. de Paris, November 1934, p. 549.

In 1927 the Society of Ophthalmology of Paris showed great interest in the general treatment of myopia and especially in the treatment by

massage. A committee consisting of Morax, Polack, Rochon-Duvigneaud and Mawas was appointed to study the problem of myopia. They were charged (1) to define myopia and its situation in the picture of general ocular pathology and (2) to express an opinion concerning the medical treatment of the condition.

The report is divided into three parts: The first is devoted to the study of myopia in general. The second part deals with the three factors of anatomy, dioptrics and physiology. The third part takes in the state of knowledge of what is called myopic chorioretinitis.

Part 1 is divided as follows: (*a*) spherical refraction in general; (*b*) genesis of spherical refraction; (*c*) refractive curvatures; (*d*) refraction of animals, and (*e*) experimental research on myopia.

Part 2 concerns: (*a*) general evolution of the eye and asymmetry; (*b*) structure, with the histologic significance and histophysiology of the sclera; (*c*) physiologic pathology of the myopic eye, and (*d*) classification of myopic eyes.

Part 3 considers chorioretinitis as follows: (*a*) definition and classification; (*b*) symptoms; (*c*) pathologic anatomy; (*d*) ophthalmoscopy; (*e*) evolution and complications; (*f*) etiology, and (*g*) hygiene and treatment.

The entire article is too detailed for abstraction. A very abundant discussion is included.

L. L. MAYER.

THE QUESTION OF THE PROCESS OF ACCOMMODATION. J. W. NORDENSON, Klin. Monatsbl. f. Augenh. **93:** 591 (Nov.) 1934.

Nordenson discusses recent publications on the process of accommodation, especially that of A. von Pflugk (*Klin. Monatsbl f. Augenh.* **92:** 445 [April] 1934; abstr., ARCH. OPHTH. **13:** 476 [March] 1935). Von Pflugk's principal argument against von Helmholtz' theory of accommodation is that the fibers of the zonula are not a rigid system, as claimed by von Helmholtz; they have an elasticity nine times greater than that of the capsule of the lens. Nordenson misses certain statements by von Pflugk as to whether the capsule of the lens elastically is isotropic or heterotropic, i. e., whether it is equally elastic or unequally elastic in different directions. It is necessary to find out whether the fibers of the zonula produce sufficient tension on the capsule of the lens in a state of rest. To find this out, the actual distention of the capsule of the lens and the distance through which the insertions of the fibers of the zonula may move must be calculated before conclusions can be drawn.

Another argument of von Pflugk against von Helmholtz' theory is that there is an incongruence between the measurements of the living eye during accommodation and those of the dead eye after separation of the zonular belt. Nordenson contends that a radius of 8 mm. has not always been found on the anterior surface of the lens after separation of the zonula. He doubts, furthermore, whether equally large elements of the surface of the lens have been measured in each instance. This is essential because the refracting planes of the human eye have a changing radius which increases toward the periphery. Errors may result, furthermore, because the measurements have been done on the dead eyes of old people, while the measurements of the accommodation

have been done on the eyes of young people. Von Pflugk stresses the fact that in many eyes the reflex picture in the periphery of the posterior capsule of the lens appears double. He found broadening and reduplication of this picture in human beings and monkeys, a phenomenon which he thinks is due to indentation at the posterior surface of the lens. Odqvist, on the other hand, demonstrated that reduplication and broadening occur during rest from accommodation in human eyes. Hence, the objections to von Helmholtz' theory are not valid.

Nordenson refutes von Pflugk's own theory of accommodation for the time being. He points out von Pflugk's error in assuming, to maintain his thesis, that the vitreous body is a gel, without proving that it is. He concedes the merit of von Pflugk's new ideas regarding the capsule and the belt of the lens. These ideas, however, are not sufficient to cause him to abandon von Helmholtz' theory of accommodation.

K. L. STOLL.

Retina and Optic Nerve

CATHOLYSIS AS A NEW TECHNIQUE FOR OPERATIVE CLOSURE OF HOLES IN THE RETINA AND FOR TREATMENT OF ITS DETACHMENT. A. VOGT, Brit. J. Ophth. **18:** 650 (Nov.) 1934.

The apparatus generally used for electrolysis of the lashes can be employed. The anode is placed on the surface of the eye. The cathode is a very fine needle. After removal of the conjunctiva the spot is marked on the sclera with india ink. The needle cathode is passed through the sclera, deep enough to reach the detached retina. The application is very short. A galvanic current of from 0.5 to 1 ma. is used. The hole and its boundaries must be touched. The needle can be passed into the eyes as often as one wants without danger provided the amperage named lasts less than a second each time. Therefore, very large holes and multiple holes can be treated at one operation. The cathode produces bubbles of hydrogen in the eye at its point and along its whole length. These bubbles can be seen by the ophthalmoscope. A preliminary puncture for orientation can be made.

The method is very simple, harmless and painless. The operation can be finished in from five to ten minutes. The results of the new method have been, up to the present, excellent. It has been successful in patients with very old detachment, in those with very large holes, and even in aged patients.

The anode must be applied to the bulb before the cathode pierces the sclera.

In 1893, Schoeler and Abadie tried electrolysis in cases of detachment, apparently without permanent success because they did not "aim" at the hole. Also the dosage was unsuitable. Nevertheless recognition must be accorded them for the introduction of electrolysis in the treatment of detachment. The use of the cathode was introduced by Vogt. In 1917 Verhoeff (*Ophth. Rec.* **26:** 10 [Jan.] 1917) employed catholysis with a similar technic but without attempting to sear the hole in the retina (W. Z.).

W. ZENTMAYER.

TWO CASES OF RETINAL DETACHMENT PRESENTING CERTAIN UNUSUAL FEATURES AFTER OPERATION BY SURFACE DIATHERMY. H. B. STALLARD, Brit. J. Ophth. **19:** 31 (Jan.) 1935.

A boy 13 years of age had a retinal detachment, probably traumatic and of about four years' duration. The detachment extended over more than one half of the lower fundus, including the macular region. There was an anterior dialysis with considerable retraction of the adjacent retina. Surface diathermy was done. Because of the unruliness of the boy he was discharged on the seventeenth day after the operation, with the retina still detached. Six weeks after the operation the retina was completely replaced and remained so at the time of this report, about eight months later. Visual acuity was 6/24 with a + 1.50 cylinder, axis 115 degrees, and the visual field was full.

The second patient was a woman aged 47 years. Following a hemorrhage into the vitreous the retina was found detached over an area of about three fourths of the fundus. There was a tear in the 10 o'clock meridian, 3 disk diameters from the ora serrata. Two surface applications of diathermy were made, each accompanied by a trephination. Five weeks later there was little change, but about four months after the operation the retina was entirely replaced. Vision was 6/24, one letter.

Stallard admits that his attempts to explain the somewhat dramatic course of events in these two cases are conjectural.

The article is illustrated.

W. ZENTMAYER.

OCULAR HYPOTONY IN ITS RELATION TO DETACHMENT OF THE RETINA. J. GONIN, Arch. d'opht. **51:** 426 (July) 1934.

Gonin does not believe that hypotony is either the cause or the result of detachment of the retina. He presents his reasons and describes two cases in which the condition was present and relieved by operation, with some improvement of vision. His explanation for the occurrence of hypotony is that the choroid has become detached in the same way as may occur following trephining. He does not believe it to be a contraindication to operation. It does, however, constitute a serious indication of an already advanced pathologic state of the eye with detachment of the retina.

S. B. MARLOW.

DETACHMENT OF THE RETINA AND DEFICIENCIES IN THE FIXING AND SUPPORTING STRUCTURES OF THIS MEMBRANE. J. ROLLET, Arch. d'opht. **51:** 431 (July) 1934.

Detachment of the retina, aside from its nature and intimate causes, appears on anatomic examination to be essentially a disunion or separation of two retinal layers. Rollet devotes the first part of this paper to a discussion of the factors which tend to hold the two layers in apposition. He divides them into two general classes which he calls active and passive: In the passive group he places the scleral shell, the domelike shape of the vitreous, the surface tension, etc. The active factors have to do with the vitality of the cells of the retina and the pigmented

epithelium, especially in regard to their physicochemical reactions, swelling, turgescence, osmotic tension, etc. In the second part he discusses the physiopathologic mechanism of detachment of the retina. It may result from a change either in the passive or in the active fixing factors. These changes are discussed in some detail, comparison being made with the detachment which takes place in an enucleated eye. The rôle which nutrition plays in the production of detachment is pointed out from the point of view of blood supply and nerve supply. Tears, he suggests, are trophic ulcers and are neither the cause nor the result of the detachment but are due to the underlying causes. The influence of the weight of the retina and that of movement of the eye are considered along with the development of subretinal fluid. The function of Müller's fibers is described, and the changes which take place in the retina are considered in relation to the occurrence of syringomyelia. All these factors are correlated with the results which have been obtained by treatment.

S. B. MARLOW.

PATHOGENESIS OF CALCAREOUS CONCRETIONS OF THE DISK IN RELATION TO CALCINOSIS. M. CORRADO, Ann. di ottal. e clin. ocul. **62:** 721 (Sept.) 1934.

Corrado reports a case of a condition which is apparently identical with what is known in this country as drusen of the optic disk, with normal vision in each eye. The blood calcium was normal. The literature is discussed, including some histologic reports previously made showing the presence of calcium in such deposits. It is concluded that in this case local disturbances must be held responsible for the deposit of calcium.

S. R. GIFFORD.

DIAGNOSIS OF OBSTRUCTIONS OF THE CENTRAL ARTERY OF THE RETINA. L. P. TORTELLA, Arch. de oftal. hispano-am. **34:** 544 (Oct.) 1934.

After reviewing the features of embolic, thrombotic and angiospastic obstruction of the central artery of the retina, Tortella presents the clinical notes on three cases: one of thrombosis of the central artery complicated with angiospasm, from which there was a partial recovery; one of obstruction of the central artery in a patient suffering from alcoholism, and one of angiospasm at first considered to be one of thrombosis. He concludes that a clinical differentiation between an angiospasm and an embolism of the central artery of the retina is always difficult and at times impossible; that the treatment with vasodilators may supply the necessary diagnostic data; that although different authors have reported favorable results with such drugs as amyl nitrite, atropine and an extract from the pancreas, he considers acetylcholine less dangerous and more effective; that angiospasm in connection with embolism and thrombosis is frequent, and that in view of the little efficiency of therapeutic means in cases of embolism of the central artery the treatment with vasodilators is indicated especially in cases with arterial hypertension.

C. E. FINLAY.

A Subretinal Cysticercus Extracted from Each Eye. J. Verdaguer, Arch. de oftal. hispano-am. **34:** 622 (Nov.) 1934.

This is the report of a case of bilateral retinal cysticerci. According to Kraemer, only one other case is reported in the literature. The findings are discussed in detail. The operations, after a precise localization, were followed by successful results.

C. E. Finlay.

A Contribution to the History of Detachment of the Retina. M. Latte, Ztschr. f. Augenh. **84:** 217 (Oct.) 1934.

A sketch is given of the various theories that have been advanced to explain the mode of occurrence of retinal detachment. Beginning with Maite-Jan, who first observed detachment anatomically in 1691, and St. Yves, who gave it a name in 1722, Latte outlines the views of von Graefe and his pupils (de Wecker and Leber, in particular), who first noted the frequency of and attached significance to retinal tears. Then follow the different theories of present observers (Gonin, Vogt, Lindner, Guist and many others). Latte endeavors to show how the accumulation of anatomic and clinical facts has altered the emphasis laid on such possible factors as exudates from the choroid collecting behind the retina, thinning and stretching of the retina, chorioretinitic areas, senile and other degenerative changes in the retina, shrinkage and retraction of the vitreous, and destruction of its framework.

H. L. Begle.

Treatment of Optic Atrophy and Retinitis Pigmentosa. T. Kriloff, I. Levin and F. Tropishko, Sovet. vestnik oftal. **5:** 230, 1934.

Nine patients suffering from retinitis pigmentosa and nine from optic atrophy were treated with inhalations of amyl nitrite on the basis that this treatment may improve the nutrition because of the increased circulation of blood in the retina and optic nerve. From 2 to 5 drops of amyl nitrite were inhaled by the patients from five to eight times. The blood pressure, vision and visual fields were examined before and after every inhalation. A temporary improvement was observed only in three cases of retinitis pigmentosa. Since the results were unsatisfactory, some patients were treated later with retrobulbar injections of a solution of atropine sulphate (1 : 1,000). These injections improved both conditions, particularly in the early stage of the disease, when vision and visual fields were preserved to a certain degree. No conclusions are drawn, although the belief is expressed that injections of atropine are more effective and effective longer than inhalations of amyl nitrite in the treatment of optic atrophy and retinitis pigmentosa.

O. Sitchevska.

Retrobulbar Neuritis During Pregnancy. Y. A. Kagan, Sovet. vestnik oftal. **5:** 503, 1934.

Retrobulbar neuritis recurring during three consecutive pregnancies is described. No other cause could be traced, and interruption of the pregnancy led to normal functioning of the optic nerve and regaining

of normal vision. A complete loss of vision with a central scotoma (the fundus being normal) was observed in the left eye only as early as the fourth or fifth week of each pregnancy. O. SITCHEVSKA.

Trachoma

ON THE STRUCTURE OF HERBERT'S PITS. A. BUSACCA, Brit. J. Ophth. **19:** 26 (Jan.) 1935.

Busacca has pursued his studies and confirms his previously expressed opinion that Herbert's pits consist histologically in proliferation of the corneal epithelium on those points where the nodules of trachoma previously appeared.

To determine precisely in serial section the seat of the tissues corresponding to the pit this area was tattooed with chinese ink one month before it was removed for study. In this way it was also confirmed that the trachoma nodules of the limbus begin at the distal margin of the "lunula," i. e., that portion of the conjunctiva which takes part in the formation of the limbic region.

Considering that with the biomicroscope these areas appear optically empty and that the opaque tissues, i. e., the episcleral and scleral layers, which normally take part in the formation of the limbic region, are absent in the pit area, it follows that the lamellae of the cornea are visible through the proliferated epithelium which lies behind. Owing to this fact the area corresponding to the pits is more transparent than normal.

The article is illustrated. W. ZENTMAYER.

LATENT TRACHOMA. C. CHARLIN, Arch. de oftal. hispano-am. **34:** 584 (Nov.) 1934.

This paper refers to cases of trachoma masked by superadded acute conjunctival disorders and to others in which the lesions are discernible only with the slit lamp and the corneal microscope, conditions which may occur in apparently normal eyes, in eyes showing benign chronic conjunctivitides, blepharitis with chronic conjunctivitis, blepharokeratoconjunctivitis of a scrofulous nature, apparently spontaneous trichiasis, entropion or ptosis and in eyes with apparently primitive corneal ulcers. Ten illustrative case reports are attached. C. E. FINLAY.

TRACHOMATOUS INFECTION OF DENIG'S FLAP. V. P. ROSHSCHIN, Sovet. vestnik oftal. **5:** 527, 1934.

A number of patients were operated on by Roshschin for trachomatous pannus after Denig's method—transplantation of mucosa from the lip. In eleven patients in whom the trachomatous process was severe the graft became infected with trachoma. In two of these patients true trachomatous follicles were observed in the graft with the slit lamp. The microscopic examination revealed heavy infiltration of the transplant by the same cellular elements which are found in the trachomatous conjunctiva (a number of plasma cells, small lymphocytes, large mononuclears, histiocytes, eosinophils and a proliferation of fibroblasts). In one patient the infection occurred within twenty days after the transplantation.

Roshschin believes that the infection occurs by continuity from the scleral conjunctiva. The transplanted mucosa under new conditions evidently changes in biologic character, becoming susceptible to the action of the trachomatous virus and reacting like the "native" conjunctiva.

O. SITCHEVSKA.

Tumors

CHOROIDAL ENDOTHELIOMA IN A PATIENT WITH MULTIPLE METASTASES. D. GIANNINI, Ann. di ottal. e clin. ocul. **62:** 852 (Oct.) 1934.

A woman of 65 who had undergone an amputation of the breast for carcinoma one year before was seen with a detachment in one eye. The intra-ocular tension was normal, but rose to 46 mm. after two months, at which time transillumination revealed a solid mass behind the retina. The reaction for melanin in the urine was negative. A metastasis from the former carcinoma of the breast was suspected, but after enucleation sections showed a true endothelioma of the choroid. The patient died a year later, and autopsy revealed a recurring carcinoma of the breast, an adenocarcinoma of the pyloric end of the stomach and metastases in the pleura, liver and peritoneum. These were similar in nature to the pyloric tumor and were thought to be secondary to it rather than to the two other neoplasms. An epithelial origin could be excluded for the ocular neoplasm, and Giannini concludes that the three tumors were independent of each other and all primary. He believes that the choroidal neoplasm could not be classified as a sarcoma but was of a benign type.

S. R. GIFFORD.

GLIOSIS OF THE OPTIC NERVE. M. CHIOVENDA and M. PAGANI, Rassegna ital. d'ottal. **3:** 703 (Sept.-Oct.) 1934.

A small tumor of the optic nerve was removed from a child 13 years of age. Histologic examination showed amyelinated fibers and typical astroglial elements disposed as irregularly crossed fiber bundles, with normal connective tissue septums. Chiovenda and Pagani consider this process as a "gliosis of the optic nerve," that is, a primary hyperplastic process of the glial elements of the nerve.

The interest in this report is increased by a brief but critical review of the various primary, secondary and mixed types of hyperplasia (gliomas, gliomatosis, gliosis, infective glial sclerosis, reparative glial sclerosis). An extensive bibliography is appended.

V. R. SYRACUSE.

Uvea

HISTOLOGIC EXAMINATION OF A METASTATIC ABSCESS OF THE CHOROID. RYONOSUKE HIGUCHI, Klin. Monatsbl. f. Augenh. **93:** 348 (Sept.) 1934.

A man, aged 63, had a large furuncle on the left temple above the ear. When the furuncle opened spontaneously on the twenty-fourth day, hemicrania of the left side, pain in the left orbit and failure of vision in the left eye developed. The right eye remained normal in appearance and function. Aside from a slight irritation of the left eye,

an almost flat, nearly round, grayish-white elevation was observed in the area of the posterior pole, temporal from the disk. It measured 4 by 3 disk diameters. The eyeball resisted every form of therapy and was enucleated. A detailed histologic description is given.

The findings prompt Higuchi to the opinion that this metastatic abscess of the choroid originated at the posterior pole of the globe and that the covering retina was involved secondarily. The identity of the bacteria could not be established.

K. L. STOLL.

SYPHILIS AND THE EYE: SYPHILOMA OF THE CILIARY BODY. R. G. BERBEROV, Sovet. vestnik oftal. **5:** 565, 1934.

A syphiloma of the ciliary body is visible when it becomes so extensive that it causes a tumor-like protrusion of the wall of the sclera with an accompanying severe inflammatory reaction. Up to 1930 only 147 cases of syphiloma of the ciliary body had been recorded in the world's literature. Berberov observed eight such syphilomas in 155,433 patients who were examined for ocular conditions in the period from 1915 to 1931 in the Kuban Eye Clinic. The ages of 6 of the patients varied from 20 to 31 and 2 patients were aged 40 and 52 years. Four patients gave a history of syphilitic infection occurring from one to three years previous to the involvement of the eye. Four patients denied that they had syphilis, but the Wassermann reaction of the blood of each was 4 plus, and clinically there were signs of syphilis. Their syphilis was acquired.

In all the patients the eye disease presented a characteristic clinical picture and course. A tumor-like protrusion of the sclera of violet color was observed in the region of the ciliary body. There was a severe iridocyclitis with formation of a plastic exudate, with posterior synechiae and occlusion of the pupil following in all but 2 cases. Five of the eight eyes became blind, which makes 62.5 per cent. This high incidence of blindness can be explained not only by the severity of the eye disease but also by the insufficiency or lack of specific treatment until the eye became involved.

Specific therapy, applied as soon as the patient came under observation, acted very favorably on the local process in the eye. Within from four to six weeks the syphiloma absorbed and the inflammatory reaction subsided, but the destruction of the fine structures of the eye was too far advanced for the treatment to prevent blindness.

O. SITCHEVSKA.

Visual Tracts and Fields

BINASAL HEMIANOPIA. A. BAUDOUIN, P. HALBRON and M. DEPARIS, Rev. neurol. **2:** 531 (Nov.) 1934.

The authors report a case of pontocerebellar tumor, verified at operation, which, during its growth, was evidenced in binasal hemianopia. Because of the unusualness of this sign the entire literature was reviewed, and an attempt made to explain the mechanism of the symptom. The examination in their case and the progress of the condition are reported in detail. In addition, two cases seen by Dr. Hartmann are reported in brief. Records of the visual fields accompany the article. Neither the

theory of von Graefe nor that of Henschen is upheld. The authors believe that the condition is a coincidence in the evolution of glaucoma or retinitis. The article is illustrated and has an extended bibliography.

L. L. MAYER.

Sympathetic Ophthalmia

THE PATHOLOGY OF SYMPATHETIC OPHTHALMIA: SYMPATHIZING OPHTHALMIA WITHOUT SYMPATHETIC OPHTHALMIA; INOCULATION CHANCRE. W. FELSENTHAL, Ann. d'ocul. **171:** 944 (Nov.) 1934.

The condition is a rare one; Felsenthal believes that there are only five analogous cases recorded in the literature. After close scrutiny of the five, he has excluded two, so that there remain only three cases about which one can be certain. He insists on the importance of inoculation chancre (point of entrance). This was first reported by Redslob, who gave it the name of inoculation chancre without admitting the possibility of specific infection. The case reported here shows absolute independence between the inflammatory processes in the two eyes and shows that the degree of inflammatory infiltration in the sympathizing eye had no influence on the development in the healthy eye.

Felsenthal comments on the different theories of the pathogenesis of sympathetic ophthalmia: the theory that it is metastatic, Elschnig's theory that it represents an antigenic effect on the uveal tissue, the theory of von Hippel that it is tuberculous, and the mixed theory of Redslob by which Felsenthal explains his case. According to the latter theory, the micro-organisms of the conjunctival sac penetrate into the wound, an inoculation chancre develops in the injured uveal tissue, and the micro-organisms enter the body. Since the two uveas are susceptible, infection usually occurs in the two eyes, very rarely in the one alone. Early enucleation is suggested to prevent infection of the noninjured eye.

The article is illustrated with three figures. There is also a bibliography.

S. H. MCKEE.

COMPARATIVE STUDIES OF SYMPATHETIC OPHTHALMIA AND ACUTE DIFFUSE CHOROIDITIS (HARADA): III. CLINIC OF ACUTE DIFFUSE CHOROIDITIS (HARADA). C. HAMADA, Acta soc. ophth. jap. **38:** 109 (Aug.) 1934.

Hamada has observed ten cases of acute diffuse choroiditis and has reached the following conclusions:

1. This disease begins with marked visual disturbances in both eyes and, in addition, meningeal symptoms such as headache, increased pressure and an increased number of lymphocytes in the cerebrospinal fluid, vestibular symptoms, vertigo, vomiting, dizziness, leukoderma, loss of hearing and white discoloration of the hair.

2. There was diffuse inflammation of both the iris and the ciliary body without formation of nodules. The pupils were dilated, and the reaction was slow. At the beginning there were symptoms of irritation, photophobia, tearing, ciliary congestion and chemosis.

3. The changes in the fundus at first consisted in many localized elevations of the retina. The edema was particularly noticeable at the

posterior pole. After a few days these swellings became uniform, and the picture of neuroretinitis was distinct, except that the center of the disk was definitely depressed like a funnel. In addition to the diffuse changes in the choroid, in seven cases typical detachment of the retina was present. These marked changes all disappeared after from two to four months, leaving the eyeground poor in pigment. When the macula was not affected the outcome in most cases was good.

4. The general symptoms and the meningeal, vestibular, cochlear, skin and head changes were observed at the same time as the ocular symptoms. They may be regarded as symptoms of hyperfunction, and in severe cases there were symptoms of atrophy, blanching of the hair, deafness, etc.

5. The changes in the eye and in the general condition are very similar to those of sympathetic ophthalmia. It is possible that both belong to the same disease, one affecting the pigment cells of the body.

A. KNAPP.

Therapeutics

ACTION OF ULTRAVIOLET RAYS ON THE FOLLICULAR CONDITION OF THE PALPEBRAL CONJUNCTIVA OF DOGS. A. G. GRINBARG and N. J. BLIDSTEIN-NEVOROCHKINA, Arch. d'opht. **51:** 602 (Sept.) 1934.

The authors present the results of experiments in which they showed that ultraviolet rays have a curative effect on a follicular conjunctival condition in dogs without producing injury to the cornea. The ultraviolet rays act favorably not only directly but also indirectly on this disorder and on the general condition. The most marked curative effect is obtained with small doses. Large doses produce lesions in the rabbit's cornea; small doses have no harmful effect.

S. B. MARLOW.

BIOLOGIC ACTION OF ROENTGEN AND RADIUM RADIATIONS ON THE EYE. M. STROHL, Bull. Soc. d'opht. de Paris, November 1934, p. 533.

At first x-rays were used only to picture lesions of the orbit and intra-ocular foreign bodies, as the fear of a danger to the ocular structures prevented such methods being used in the therapy of ocular disease. Subsequent experimental evidence has been somewhat contradictory. The answer appears to be that the different tissues of the eye do not react to the x-rays in the same manner.

The therapeutic effect of the x-rays on inflammatory disease of the eye has been shown by Salvatori and Marzio, who were able to cure a large percentage of patients with such conditions as ulcerative keratitis, parenchymatous keratitis and uveitis and a few patients with trachoma. (A table is given in the article.) The first dose given is only 20 per cent of the erythema dose. Chappé and Sulzer report favorably on the treatment of cicatricial opacities of the cornea with a nonfiltered (5 or 6° Benoist), little penetrating ray, in light applications not to exceed 700 roentgens (Solomon) for each sitting. The treatments were given for eight hours, then a two months' vacation was allowed and again five treatments were given. Lapersonne and Terson have used radium

with much success in angiomas of the lids and orbit, especially in those of infants. Experimentally Krasso has evolved a new mode of roentgen treatment of high efficiency with a superior coefficient of security from harmful affects. He used the Bucky rays, that is, the longer waves of less penetrative power. In certain cases of malignant tumors an injury to the eye is of no consequence, as sacrifice of the eye is contemplated, and the question of whether roentgen or radium therapy is the better is paramount. In epitheliomas of the lid Laborde has had excellent results from the use of radium implants in platinum containers. The content of the implant is from 1 to 2 mg. of radium element.

The two modes of treatment are not absolute equivalents. If the x-rays give no therapeutic aid, secondary treatment with radium is indicated.

Methods of protection are discussed, and the question of surgical treatment of radioresistant tumors is emphasized.

Strohl believes that the accidents due to roentgen and radium therapy are becoming less and less as ophthalmologists understand better the nature of the growths and the physical elements.

L. L. MAYER.

Toxic Amblyopia

INFLUENCE OF VASCULAR CHANGES ON THE FUNCTIONAL AND ANATOMIC DISTURBANCES OF THE RETINA AND OPTIC NERVE IN QUININE POISONING. D. GIANNINI, Ann. di ottal. e clin. ocul. **62:** 1069 (Dec.) 1934.

The literature is reviewed, including the five reported cases in which histologic examination of the eyes was secured. In three of these cases the disturbances followed injection of ethylhydrocupreine, and in two, quinine. In most cases degenerative changes were found in the retina and optic nerve, while in Saba's case there was marked hyperemia of the retina with edema. Experimental work has shown varying effects on the retinal vessels, and some authors have reported a direct toxic effect on the retinal elements without any vascular changes.

Giannini produced chronic quinine intoxication in two dogs, one of which received at the same time injections of the vasodilator acetylcholine. The first animal given quinine alone showed narrowing of the arteries and pallor of the disks, while the one receiving acetylcholine as well maintained the normal caliber of the vessels and the pink color of the disks. The first animal lost all pupillary reaction to light and was apparently blind, while the other retained this reaction. Sections of the first animal's eyes after six weeks of treatment showed degeneration of the ganglion cells and obliteration of some of the retinal arteries, while those of the second dog's eyes disclosed no changes in ganglion cells or vessels. He concludes that probably most or all of the damage to the nerve in the cases reported clinically was due to spasm of the central vessels.

S. R. GIFFORD.

Society Transactions

EDITED BY DR. JOHN HERBERT WAITE

NEW YORK ACADEMY OF MEDICINE, SECTION OF OPHTHALMOLOGY

Feb. 18, 1935

WEBB W. WEEKS, M.D., *Chairman, Presiding*

GUERNSEY FREY, M.D., *Secretary*

SLIT-LAMP STUDY OF A HOLE IN THE RETINA. DR. EMANUEL ROSEN (by invitation).

In the case at hand the detachment was baglike and extended into the anterior third of the vitreous. With the ophthalmoscope three holes could be made out, one oval, about 1½ disk diameters in size, and the other two slitlike. The lower margin of the oval hole was definitely limited by a blood vessel, which appeared to be the prime factor in preventing the lateral spread of the tear. With the slit lamp, a current of fluid bearing pigment granules could be seen moving outward from the hole into spaces in the vitreous framework. Many pigment granules in this area seemed to be attached to this framework. These granules moved with movement of the vitreous framework and returned to their original position. The slitlike holes did not show a pigmentary current. The vessels close to the tears showed several small flame-shaped hemorrhages.

EMBOLISM OF THE CENTRAL RETINAL ARTERY RELIEVED BY A SOLUTION CONTAINING SODIUM NITRITE. DR. BENJAMIN ESTERMAN (by invitation).

A case of embolism of the central retinal artery is reported which was relieved by treatment with a solution containing sodium nitrite.

DISCUSSION

DR. SIGMUND AGATSTON: In this case reported by Dr. Esterman, the diagnosis of embolism of the central retinal artery is not positively established. No cardiac condition was found. There was nothing suggesting an etiologic factor which would cause an embolism. Attacks of transient loss of vision occur frequently and may last from three minutes to an hour. In Dr. Esterman's patient one may be dealing with a transient spasm. While I do not deny that the solution containing sodium nitrite or amyl nitrite is the proper drug to use in the treatment of embolism and spasm, nevertheless since there are many cases of spontaneous recovery, one has to be very careful in taking it for granted that these vasodilators are effective in treatment. In two recent cases in which I used the drug named, I obtained very good results. I have also seen cases of this character in which recovery took place when no treatment was given.

BLINDNESS: ITS CAUSES AND PREVENTION. DR. PARK LEWIS (by invitation).

The causes of disease are sought for in the laboratory and in the application of research to clinical studies. The physician deals only with the individual patient, and it is his function to repair damages after they have occurred. To control conditions which produce disease there must be authority to enter the home, the workshop and the factory with power to regulate unhygienic and insanitary conditions. No law or ordinance can be enforced except with the approval of the people whom it concerns. There are, therefore, two distinctive kinds of attack in protection of sight. The first consists in the training given to students in the medical schools and in the lectures and clinical demonstrations of the accepted knowledge concerning diseases of the eyes and the causes of these conditions. The second consists in popular education concerning conditions through which sight may be endangered in order that proper protective measures may be understood and, where necessary, suitable regulations enforced.

Letters sent to twelve of the leading universities made evident that present training in regard to the prevention of ocular diseases is incomplete. This is recognized by ophthalmologists, but it has been difficult to improve the training because of limitations of time in the teaching of a specialty. There should be at least one lecture in each course on ophthalmology outlining the means of prevention and the necessity of the physician's cooperation.

DISCUSSION

DR. CONRAD BERENS: Any work, medical or educational, with the partially seeing child presupposes the cooperation of the ophthalmologist; his diagnosis, his methods of treatment, his advice and his recommendations are essential to the success of any undertaking. Yet few ophthalmologists are cognizant of the fact that 454 sight-saving classes, representing 144 cities and 24 states, plus the District of Columbia, have been established in the United States for children whose vision in the better eye, after correction, falls between 20/70 and 20/200, and for those suffering from progressive ocular difficulties. Even many ophthalmologists who do know of the existence of such classes fail to realize that of the 50,000 partially seeing children in the United States only 6,000 are being given educational opportunities suited to their needs.

MRS. WINIFRED HATHAWAY: One sees in a sight-saving class modern miracles from the educational side. A mother who has come to scoff at the idea of having her boy placed in a special class has remained to pray that the child may be given the opportunity of overcoming the ocular handicap so that he may not go down to defeat. The child rapidly joins in with the other children, enjoying their work and their play, becoming a real human boy—truly an educational modern miracle made possible because of the advice of the ophthalmologist who, realizing the boy's real difficulties, recommended that he be given an opportunity to overcome them—a miracle of changing a liability into an asset.

DR. LEWIS H. CARRIS: The Society for the Prevention of Blindness recognizes that ophthalmologists, because of their professional training, skill and activities, are the prime savers of sight; we feel that

our work is closely bound with yours. The society certainly appreciates the cooperation of this section in giving annually practically a whole evening to a discussion of the sociologic implications of ophthalmology—the field of endeavor for which we are particularly organized. We hope this practice may be continued and that you will increasingly call on us for our publications and reference books on the sociologic aspects of the prevention of blindness.

DR. COLMAN W. CUTLER: It is recognized that the Society for the Prevention of Blindness has been of inestimable value in the past. I need only emphasize the variety of work that has been done, from the beginning, with ophthalmia neonatorum, with wood alcohol amblyopia and now with questions of social hygiene. This is a matter of education, and the public should be taught to face matters of venereal infection frankly. I feel rather strongly on this point, and in a recent contribution to the symposium at the annual meeting of the society, the subject of compulsory Wassermann tests for all expectant mothers was made very clear.

DR. ELLICE M. ALGER: As a profession we deal with individuals and not with the masses, and it is perfectly natural that our attention should be focused on the not infrequent and dramatic cure of blindness rather than on the more prosaic and impersonal prevention.

It was not chance alone that determined the identity of its pioneers. They were, first, physicians like Dr. Lewis and educators like Mr. Van Cleve who saw the blind massed together in institutions as no one else saw them, and realized how much of it was utterly unnecessary. For years they read papers and attended meetings and appeared before legislatures, seeking to get money appropriated and bills passed, which mostly suffered the fate of all bills which have no active public support. Then they strove to interest socially minded men and women who knew little about the technic of prevention but did know how to raise money and make effective the enormous latent powers of public sympathy and support. Groups were organized in various parts of the country which lived or grew, or languished and died according to the quality of their leadership. Finally some of the survivors consolidated into a national society, which because of the universality of its appeal and the wisdom of its management grew from very small beginnings into a strong society with its influence steadily growing and its finances apparently depression-proof.

DR. A. EDWARD DAVIS: I believe that cataract stands first as a cause for blindness, and that after an early diagnosis much can be accomplished by nonoperative treatment.

PROVISIONS FOR SCHOOLING OF THE BLIND AND PARTIALLY BLIND. MR. EDWARD VAN CLEVE (by invitation).

This paper will be published in full in a later issue of the ARCHIVES.

Book Reviews

Modern Ophthalmic Lenses and Optical Glass. By Theo. E. Obrig. Price, $4.50. Pp. 323, with 168 illustrations and 9 tables. Published by the author, 1935. Distributed by Gall & Lembke, Inc., New York.

This work differs from other books on the same subject in that it is concerned chiefly with the various types of lenses and glasses which are at present available for filling the refractionist's prescriptions.

The introductory chapters, which are short but adequate, deal with the history of glass, the manufacture of optical glass, the history of lenses and spectacles, the theory of lens action and the types of aberrations which occur in ophthalmic lenses. As Obrig notes, one reason for the high cost of lenses is the fact that only about 50 pounds (22.7 Kg.) of finished lenses are obtained from an original melt of 600 pounds (272.4 Kg.) of glass, while for certain types of bifocal lenses, only 12 (5.4 Kg.) pounds of finished lenses are obtained from the same original melt of 600 pounds.

The succeeding chapters give brief but adequate descriptions of: (1) the properties and suitability of various types of colored lenses; (2) the various types of modern single vision lenses (Punktal, Katral, Orthogon, Tillyer, Widesite, Kurova, Ultex, Univis, Nokrome, Thin-Lite and Myo-Disc) and their essential differences, as well as the nonshatterable and other special types (Dualens and Chavasse); (3) contact lenses (Müller, Danz, Zeiss and Dallos); (4) telescopic spectacles (Zeiss, Feinbloom and Eggers); (5) iseikonic lenses; (6) modern bifocal lenses, which are divided into the one-piece types (Ultex, Myo-Disc, Rederite, and C. V.) and fused types (Kryptok, Univis, Fulvue, Widesite, Nokrome and Panoptik), as well as cataract bifocals, which in turn are grouped into those in which optical performance is secondary to appearance and those which give a maximal optical performance, with disregard for the cosmetic effect.

There are also short but informatory chapters on trifocal lenses, vocational bifocal and trifocal lenses and the use and applicability of the Rochat optical slide rule, plus a chapter (with four tables) on prism compensations in bifocal segments, which will be of more interest and value to opticians than to ophthalmologists.

Obrig, who developed the Myo-Disc lens, states in the introduction that it has been his desire to present, without the use of too involved mathematical formulas, the advantages and defects of the various lenses at present available for filling prescriptions. He has not only succeeded in carrying out his original intentions but has also included a great deal of interesting and valuable information in his book.

W. F. DUGGAN.

Twenty-First Annual Report of the Ophthalmic Section of 1933. Department of Public Health, Ministry of the Interior, Egypt. Price, 10 piasters. Pp. 42. Cairo: Government Press, 1935.

This report shows the continued excellent work which is being done in the various ophthalmic units in Egypt. In 1933, the new patients numbered 825,304; there were 25,728 inpatients and 277,424 operations. The number of patients found to be blind in one or both

eyes was 6.4 per cent. The pathologic cause of blindness was represented by acute ophthalmias in 80 per cent of the causes, and the gonococcus was the dominant factor of infection. Of 10,066 pupils examined in school clinics, 98 per cent were found to be suffering from trachoma in its various stages, and in 44 per cent the disease was in a serious stage. A list of the interesting cases is given. During this year 1,545 operations were performed for senile cataract, 338 for soft cataract and 82,950 for trichiasis or entropion; trephining for glaucoma was done in 1,332 cases, and tenotomy and advancement in 21. A list of the diseases, causes of optic atrophy and a list of operations follow.

The Ophthalmological Society of Egypt held its annual meeting on March 23, 1934, at Giza, and the reports on the topics treated at this meeting constitute a separate volume.

The pathologic report for the year is also published in a separate volume.

ARNOLD KNAPP.

News and Notes

UNIVERSITY NOTES

Dr. Henry Carroll Smith has recently been appointed associate professor of clinical ophthalmology at Vanderbilt University School of Medicine, Nashville, Tenn.

Dr. Walter Robert Parker received the honorary degree of Doctor of Science at the recent commencement exercises of the University of Michigan. Dr. Parker was professor of ophthalmology at the university for twenty-eight years. He has been professor emeritus since 1933.

GENERAL NEWS

Examination by American Board of Ophthalmology.—Because of a conflict in dates, the American Board of Ophthalmology has canceled its examination set for Tuesday, September 17, at Cincinnati. Instead, there will be an examination on Monday, November 18, at St. Louis, at the time of the meeting of the Southern Medical Association.

All applications should be filed with the secretary, Dr. William H. Wilder, 122 South Michigan Avenue, Chicago, at least sixty days prior to the date of the meeting.

Directory of Ophthalmologic Societies *

INTERNATIONAL

International Association for Prevention of Blindness

President: Prof. F. de Lapersonne, 217 Faubourg St. Honoré, Paris.
Secretary-General pro tem: Dr. A. Churchill, 66 Boulevard St. Michel, Paris.

International Ophthalmologic Congress

Secretary: Dr. Francisco Poyales, Olozaga 3, Madrid.
Place: Cairo. Time: 1937.

FOREIGN

British Medical Association, Section on Ophthalmology

President: Dr. A. J. Ballantyne, 11, Sandyford Pl., Glasgow, C 3.
Secretary: Dr. J. Ringland Anderson, 108 Collins St., Melbourne.
Place: Melborurne. Time: Sept. 11-13, 1935.

Ophthalmology Society of Bombay

President: Dr. D. D. Sathaye, 127 Girgaum Road, Bombay 4.
Secretary: Dr. H. D. Dastur, Dadar, Bombay 14.
Place: H. B. A. Free Ophthalmic Hospital, Parel, Bombay 12. Time: First Friday of every month.

Ophthalmological Society of the United Kingdom

President: Mr. R. Foster Moore, 53, Harley St., London, W. I.
Secretary: Miss Ida Mann, 7, Wimpole St., London, W. I.

Oxford Ophthalmological Congress

Master: Dr. C. G. Russ Wood, Hill House, Abberbury Rd., Iffley, Oxford, England.
Hon. Secretary-Treasurer: Dr. F. A. Anderson, 12 St. John's Hill, Shrewsbury, England.

Royal Society of Medicine, Section of Ophthalmology

President. Dr. Ransom Pickard 31, East Southernhay, Exeter, England.
Secretary: Dr. J. D. Magor Cardell, 27, Weymouth St., London, W. 1.

Société Française d'Ophthalmologie

Secretary: Dr. René Onfray, 6 avenue de la Motte Picquet, Paris 7è.

Society of Swedish Ophthalmologists

President: Prof. F. Berg, Uppsala, Sweden.
Secretary: Dr. K. O. Granström, Södermalmstorg 4 III tr., Stockholm, Sö., Sweden.

German Ophthalmological Society

Secretary: Prof. A. Wagenmann, Heidelberg.

Chinese Ophthalmological Society of Peiping

President: Dr. P. H. Liu, Chi-Ming Eye Clinic, Ta Liu Pu Kau, Peiping.
Secretary: Dr. H. H. Feng, Peiping Union Medical College, Peiping.
Place: Peiping Union Medical College, Peiping. Time: Last Friday of each month.

* Secretaries of societies are requested to furnish the information necessary to make this list complete and to keep it up to date.

Tsinan Ophthalmological Society

Chairman: Dr. Eugene Chan, Cheeloo University School of Medicine, Tsinan, Shantung.
Place: Cheeloo University School of Medicine. Time: Last Thursday of alternate months.

NATIONAL

American Medical Association, Scientific Assembly, Section on Ophthalmology

Chairman: Dr. John Green, 3720 Washington Blvd., St. Louis.
Secretary: Dr. Parker Heath, 1553 Woodward Ave., Detroit.
Place: Kansas City, Mo.: Time: May 11-15, 1936.

American Academy of Ophthalmology and Otolaryngology

President: Dr. Wells P. Eagleton, 15 Lombardy St., Newark, N. J.
President-Elect: Dr. Frank E. Burch, 408 Peter St., St. Paul.
Executive Secretary-Treasurer: Dr. William P. Wherry, 1500 Medical Arts Bldg., Omaha.
Place: Cincinnati. Time: Sept. 16-20, 1935.

American Ophthalmological Society

President: Dr. Louis S. Greene, Washington, D. C.
Secretary-Treasurer: Dr. J. Milton Griscom, 2213 Walnut St., Philadelphia.
Place: Hot Springs, Va. Time: June 1-3, 1936.

National Society for the Prevention of Blindness

President: Mr. William Fellowes Morgan, 50 W. 50th St., New York.
Managing Director: Mr. Lewis H. Carris, 50 W. 50th St., New York.

SECTIONAL

New England Ophthalmological Society

President: Dr. James J. Regan, 520 Commonwealth Ave., Boston.
Secretary-Treasurer: Dr. Benjamin Sachs, 483 Beacon St., Boston.
Place: Massachusetts Eye and Ear Infirmary, 243 Charles St., Boston. Time: 8 p. m., third Tuesday of each month from November to April, inclusive.

Pacific Coast Oto-Ophthalmological Society

President: Dr. H. G. Merrill, 3245 4th St., San Diego, Calif.
Secretary-Treasurer: Dr. Frederick C. Cordes, 384 Post St., San Francisco.
Place: Del Monte, Calif. Time: Spring, 1936.

Puget Sound Academy of Ophthalmology and Oto-Laryngology

President: Dr. Francis A. Brugman, 509 Olive St., Seattle.
Secretary-Treasurer: Dr. Noble Dick, 1115 Terry Ave., Seattle.
Time: 8 p. m., third Tuesday of each month, except July and August.

Rock River Valley Eye, Ear, Nose and Throat society

President: Dr. W. R. Fringer, 228 S. Main St., Rockford, Ill.
Secretary-Treasurer: Dr. W. H. Elmer, 321 W. State St., Rockford, Ill.
Place: Rockford, Ill., Janesville or Beloit, Wis. Time: Third Tuesday of each month.

Saginaw Valley Academy of Ophthalmology and Otolaryngology

President: Dr. Robert Griswell, 707 Washington Ave., Bay City, Mich.
Secretary-Treasurer: Dr. W. K. Slack, 308 Eddy Bldg., Saginaw, Mich.
Place: Saginaw, Mich., or Bay City, Mich. Time: Second Tuesday of each month, except July and August.

Sioux Valley Eye and Ear Academy

President: Dr. L. H. Hohf, Yankton, S. D.
Secretary-Treasurer: Dr. J. C. Decker, Francis Bldg., Sioux City, Iowa.

SOUTHERN MEDICAL ASSOCIATION, SECTION ON EYE, EAR, NOSE AND THROAT

Chairman: Dr. William A. Wagner, 914 American Bank Bldg., New Orleans.
Secretary: Dr. O. M. Marchman, Medical Arts Bldg., Dallas, Texas.
Place: St. Louis. Time: November 1935.

SOUTHWESTERN MICHIGAN TRIOLOGICAL SOCIETY

President: Dr. F. B. Fralich, 202 S. Main St., Ann Arbor, Mich.
Secretary-Treasurer: Dr. A. S. Barr, 201 S. Main St., Ann Arbor, Mich.
Time: Third Thursday of alternate months.

WESTERN PENNSYLVANIA EYE, EAR, NOSE AND THROAT SOCIETY

President: Dr. Claude W. McKee, 229 S. Main St., Greensburg.
Secretary-Treasurer: Dr. C. W. Beals, 41 N. Brady St., DuBois.
Place: Indiana. Time: October 1935.

STATE

COLORADO OPHTHALMOLOGICAL SOCIETY

President: A presiding officer is selected for each meeting alternately until all members have served.
Secretary: Dr. Edna M. Reynolds, 227, 16th St., Denver.
Place: Capitol Life Building, Denver. Time: 7:30 p. m., third Saturday of the month, October to April, inclusive.

CONNECTICUT STATE MEDICAL SOCIETY, SECTION ON EYE, EAR, NOSE AND THROAT

President: Dr. George B. Garlick, 144 Golden Hill St., Bridgeport.
Secretary-Treasurer: Dr. Shirley H. Baron, 309 State St., New London.
Time: May, November.

EYE, EAR, NOSE AND THROAT CLUB OF GEORGIA

President: Dr. Herschel C. Crawford, 26 Lindon Ave., N. E., Atlanta.
Secretary-Treasurer: Dr. J. A. Smith, 700 Spring St., Macon.

INDIANA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

President: Dr. J. R. Dillinger, French Lick.
Secretary: Dr. Frederick V. Overman, 705 Hume-Mansure Bldg., Indianapolis.
Place: Martinsville. Time: April 8, 1936.

IOWA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

President: Dr. F. W. Dean, 532, 1st Ave., Council Bluffs.
Secretary-Treasurer: Dr. O. L. Thorburn, 213½ Main St., Ames.
Place: Council Bluffs. Time: Nov. 7, 1935.

MICHIGAN STATE MEDICAL SOCIETY, SECTION OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Chairman: Dr. John W. Orr, 503 S. Saginaw St., Flint.
Secretary: Dr. D. R. Heetderks, 26 Sheldon Ave., S. E., Grand Rapids.

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

President: Dr. H. E. Binger, 350 St. Peter St., St. Paul.
Secretary-Treasurer: Dr. Walter E. Camp, Medical Arts Bldg., Minneapolis.
Place: St. Paul. Time: May 1936.

MONTANA ACADEMY OF OTO-OPHTHALMOLOGY

President: Dr. George A. Lewis, Roundup.
Secretary: Dr. A. W. Morse, Phoenix Bldg., Butte.
Place: Billings. Time: February 1936.

NEW JERSEY STATE MEDICAL SOCIETY, SECTION ON OPHTHALMOLOGY, OTOLOGY AND RHINOLARYNGOLOGY

Chairman: Dr. C. Coulter Charlton, 124 S. Illinois Ave., Atlantic City.
Secretary: Dr. H. L. Harley, 124 S. Indiana Ave., Atlantic City.

NEW YORK STATE MEDICAL SOCIETY, EYE, EAR, NOSE AND THROAT SECTION

Chairman: Dr. John F. Fairbain, 925 Delaware Ave., Buffalo.
Secretary: Dr. Walter S. Atkinson, 168 Sterling St., Watertown.

NORTH DAKOTA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

President: Dr. Trygve Oftedal, 55½ Broadway, Fargo.
Secretary-Treasurer: Dr. F. L. Wicks, 514 6th St., Valley City.
Place: Jamestown. Time: May 1936.

OREGON ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

President: Dr. A. B. Dykman, Medical Dental Bldg., Portland.
Secretary-Treasurer: Dr. Andrew J. Browning, 418 Mayer Bldg., Portland.
Place: Good Samaritan Hospital. Time: Third Tuesday of each month.

RHODE ISLAND OPHTHALMOLOGICAL AND OTOLOGICAL SOCIETY

Acting President: Dr. Nathan Bolotow, 108 Waterman St., Providence.
Secretary and Treasurer: Dr. Gordon J. McCurdy, 122 Waterman St., Providence.
Place: Rhode Island Medical Library. Time: 8:30 p. m., second Thursday in October, December, February and April.

SOUTH CAROLINA SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

President: Dr. Josiah E. Smith, 60 Meeting St., Charleston.
Secretary: Dr. J. W. Jervey Jr., 101 Church St., Greenville.

TENNESSEE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

President: Dr. W. W. Potter, 601 Walnut St., Knoxville.
Secretary-Treasurer: Dr. W. D. Stinson, 248 Madison Ave., Memphis.

TEXAS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY

President: Dr. T. E. Fuller, 100 W. Board St., Texarkana, Texas.
Secretary: Dr. O. M. Marchman, 1719 Pacific Ave., Dallas.

UTAH OPHTHALMOLOGICAL SOCIETY

President: Dr. William Stookey, 54 E. South Temple St., Salt Lake City.
Secretary-Treasurer: Dr. T. F. Welsh, 711 Boston Bldg., St. Salt Lake City.
Time: Third Monday of each month.

VIRGINIA SOCIETY OF OTO-LARYNGOLOGY AND OPHTHALMOLOGY

President: Dr. Emory Hill, 501 E. Franklin St., Richmond.
Secretary-Treasurer: Dr. George G. Hankins, Medical Arts Bldg., Newport News.
Place: Richmond. Time: May 1936.

WEST VIRGINIA STATE MEDICAL ASSOCIATION, EYE, EAR, NOSE AND THROAT SECTION

President: Dr. F. O. Marple, First Huntington National Bank Bldg., Huntington.
Secretary: Dr. J. E. Blaydes, First National Bank, Bluefield.

LOCAL

ACADEMY OF MEDICINE OF NORTHERN NEW JERSEY, SECTION ON EYE, EAR, NOSE AND THROAT

Chairman: Dr. Alfred Stahl, 55 Lincoln Park, Newark, N. J.
Secretary: Dr. A. Russell Sherman, 671 Broad St., Newark.
Place: 91 Lincoln Park South, Newark. Time: 8:45 p. m., second Monday of each month, October to May.

ATLANTA EYE, EAR, NOSE AND THROAT SOCIETY

President: Dr. Herschel Crawford, 478 Peachtree St., N. E., Atlanta, Ga.
Secretary: Dr. Stacy C. Howell, 384 Peachtree St., N. E., Atlanta, Ga.
Place: Academy of Medicine, 13 Queen's Park. Time: 8 p. m., last Thursday of each month.

BALTIMORE MEDICAL SOCIETY, SECTION ON OPHTHALMOLOGY

Chairman: Dr. William M. Rowland, 906 Cathedral St., Baltimore.
Secretary: Dr. Mary L. Small, 18 W. Read St., Baltimore.
Place: Medical and Chirurgical Faculty, 1211 Cathedral St. Time: 8:30 p. m., fourth Thursday of each month from October to May.

BROOKLYN OPHTHALMOLOGICAL SOCIETY

President: Dr. John H. Bailey, 855 St. Marks Ave., Brooklyn.
Secretary-Treasurer: Dr. George Freiman, 703 Grand St., Brooklyn.
Place: Kings County Medical Society Bldg., 1313 Bedford Ave. Time: Third Thursday in February, April, May, October and December.

BUFFALO OPHTHALMOLOGIC CLUB

President: Dr. H. H. Glosser, 448 Franklin St., Buffalo.
Secretary-Treasurer: Dr. I. J. Koenig, 40 North St., Buffalo.
Time: Second Thursday of each month.

CHICAGO OPHTHALMOLOGICAL SOCIETY

President: Dr. Robert B. Blue, 25 E. Washington St., Chicago.
Secretary-Treasurer: Dr. Thomas D. Allen, 122 S. Michigan Ave., Chicago.
Place: Medinah Michigan Avenue Club, 505 N. Michigan Ave. Time: Third Monday of each month from October to May.

CLEVELAND ACADEMY OF MEDICINE, SECTION OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Chairman: Dr. A. D. Ruedemann, 2020 E. 93d St., Cleveland.
Secretary: Dr. Fred W. Dixon, 1029 Rose Bldg., Cleveland.
Place: Winton Hotel. Time: Fourth Friday of each month.

CLEVELAND OPHTHALMOLOGICAL CLUB

Chairman: Dr. A. B. Bruner, 629 Euclid Ave., Cleveland.
Secretary: Dr. M. W. Jacoby, Hanna Bldg., Cleveland.

COLLEGE OF PHYSICIANS, PHILADELPHIA, SECTION ON OPHTHALMOLOGY

Chairman: Dr. John Milton Griscom, 2213 Walnut St., Philadelphia.
Clerk: Dr. Alexander G. Fewell, 1924 Pine St., Philadelphia.
Time: Third Thursday of every month from October to April, inclusive.

COLUMBUS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY

Chairman: Dr. F. W. Thomas, 327 E. State St., Columbus, Ohio.
Secretary-Treasurer: Dr. H. D. Emswiler, 370 E. Town St., Columbus, Ohio.
Place: Athletic Club. Time: First Monday of each month.

DALLAS ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

President: Dr. F. H. Newton, Mercantile Bldg., Dallas, Texas.
Secretary: Dr. Maxwell Thomas, 1719 Pacific Ave., Dallas, Texas.
Place: Dallas Athletic Club. Time: 6:30 p. m., first Tuesday of each month from October to June. The November, January and March meetings are devoted to clinical work.

DES MOINES ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

President: Dr. E. G. Linn, 604 Locust St., Des Moines, Iowa.
Secretary-Treasurer: Dr. Grace Doane, 614 Bankers Trust Bldg., Des Moines, Iowa.
Time: 7:45 p. m., third Monday of every month, September to May.

DETROIT OPHTHALMOLOGICAL CLUB

Chairman: Members rotate alphabetically.
Secretary: Dr. Raymond S. Goux, David Whitney Bldg., Detroit.
Time: 6:30 p. m., first Wednesday of each month.

Eastern New York Eye, Ear, Nose and Throat Association

President: Dr. A. W. Greene, 148 Barrett St., Schenectady.
Secretary-Treasurer: Dr. Joseph L. Holohan, 317 State St, Albany.
Time: Third Wednesday in October, November, March, April, May and June.

Fort Worth Eye, Ear, Nose and Throat Society

President: Dr. T. L. Goodman, 602 W. 10th St., Fort Worth, Texas.
Secretary-Treasurer: Dr. Van D. Rathgeber, 1012 Medical Arts Bldg., Fort Worth.
Place: Medical Hall, Medical Arts Bldg. Time: 7:30 p. m., first Friday of each month except July and August.

Grand Rapids Eye, Ear, Nose and Throat Society

President: Dr. John H. McRae, 26 Sheldon Ave., S. E., Grand Rapids, Mich.
Secretary-Treasurer: Dr. Robert G. Laird, 307 Metz Bldg., Grand Rapids, Mich.
Place: Various local hospitals. Time: Third Thursday of alternating months. September to May.

Houston Academy of Medicine, Eye, Ear, Nose and Throat Section

President: Dr. R. M. Hargrove, 1202 Esperson Bldg., Houston, Texas.
Secretary: Dr. J. C. Dickson, 1617 Medical Arts Bldg., Houston, Texas.
Place: Medical Arts Bldg., Harris County Medical Society Rooms. Time: 8 p. m., second Thursday of each month from September to June.

Indianapolis Ophthalmological and Otolaryngological Society

President: Dr. J. C. Daniel, 23 E. Ohio St., Indianapolis.
Secretary: Dr. Kenneth L. Craft, 23 E. Ohio St., Indianapolis.
Place: University Club. Time: 6:30 p. m., second Thursday of each month from October to May.

Kansas City Society of Ophthalmology and Oto-Laryngology

President: Dr. H. B. Davis, 1101 Grand Ave., Kansas City, Mo.
Secretary: Dr. Byron Black, Professional Bldg., Kansas City, Mo.
Time: Third Thursday of each month from September to May. The November, January and March meetings are devoted to clinical work.

Long Beach Eye, Ear, Nose and Throat Society

Chairman: Dr. Clyde C. Harner, 110 Pine Ave., Long Beach, Calif.
Secretary-Treasurer: Dr. Paul T. Southgate, 704 Professional Bldg., Long Beach, Calif.
Place: Professional Bldg. Time: Last Wednesday of each month from October to May.

Los Angeles Society of Ophthalmology and Oto-Laryngology

President: Dr. Walter R. Crane, 756 S. Broadway, Los Angeles
Secretary-Treasurer: Dr. Pierre Viole, 1930 Wilshire Blvd., Los Angeles.
Place: Los Angeles County Medical Association Bldg., 1925 Wilshire Blvd., Time: 6:30 p. m., fourth Monday of each month from September to May, inclusive.

Louisville Eye, Ear, Nose and Throat Society

President: Dr. E. A. Leggett, 614 Breslin Bldg., Louisville, Ky.
Secretary-Treasurer: Dr. J. E. Craddock, 604 Breslin Bldg., Louisville, Ky.
Place: Jewish Hospital. Time: 6:30 p. m., second Thursday of each month from September to May, inclusive.

Medical Society of the District of Columbia, Section of Ophthalmology and Otolaryngology

Chairman: Dr. Arthur M. Zinkham, 815 Connecticut Ave., Washington.
Secretary: Dr. E. J. Cummings, 1835 I St., N. W., Washington.
Place: 1718 M St., N. W. Time: 8 p. m., third Friday of each month from October to April, inclusive.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Chairman: Each member, in alphabetical order.
Secretary: Dr. R. O. Rychener, 130 Madison Ave., Memphis, Tenn.
Place: Eye Clinic of Memphis Eye, Ear, Nose and Throat Hospital. Time: 8 p. m., second Tuesday of each month.

MILWAUKEE OTO-OPHTHALMIC SOCIETY

President: Dr. J. J. Brook, 231 W. Wisconsin Ave., Milwaukee.
Secretary-Treasurer: Dr. Herbert G. Schmidt, 238 W. Wisconsin Ave., Milwaukee.
Place: University Club. Time: 6 p. m., second Tuesday of each month.

MONTREAL OPHTHALMOLOGICAL SOCIETY

President: Dr. J. A. MacMillan, 1410 Stanley St., Montreal, Canada.
Secretary: Dr. A. L. Guertin, 410 Sherbrooke St., West, Montreal, Canada.
Time: Second Thursday of October, December, February and April.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Chairman: Dr. Wesley Wilkerson, Bennie Dillon Bldg., Nashville, Tenn.
Secretary-Treasurer: Dr. Hale Cullom, Bennie Dillon Bldg., Nashville, Tenn.
Place: St. Thomas Hospital. Time: 8 p. m., third Monday of each month from October to June.

NEW ORLEANS OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY

President: Dr. R. H. Fisher, Chess and Checker Club, New Orleans.
Secretary-Treasurer: Dr. H. F. Brewster, 837 Gravier St., New Orleans.
Place: Eye, Ear, Nose and Throat Hospital. Time: Third Thursday of each month from October to June.

NEW YORK ACADEMY OF MEDICINE, SECTION OF OPHTHALMOLOGY

Chairman: Dr. John H. Dunnington, 30 W. 59th St., New York.
Secretary: Dr. LaGrand H. Hardy, 30 E. 40th St.,, New York.
Time: 8:30 p. m., third Monday of every month from October to May, inclusive.

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY

President: Dr. John H. Judd, 107 S. 17th St., Omaha.
Secretary-Treasurer: Dr. W. A. Cassidy, 107 S. 17th St., Omaha
Place: Omaha Club, 20th and Douglas Sts., Omaha. Time: 6 p. m., dinner; 7 p. m., program; third Wednesday of each month from October to May.

PHILADELPHIA COUNTY MEDICAL SOCIETY, EYE SECTION

Chairman: Dr. Charles R. Heed, 1205 Spruce St., Philadelphia.
Secretary: Dr. Sidney L. Olsho, 235 S. 15th St., Philadelphia.
Time: First Thursday of each month from October to May.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY

President: Dr. Edward B. Heckel, 500 Penn Ave., Pittsburgh.
Secretary: Dr. George H. Shuman, Park Bldg., Pittsburgh.
Place: Pittsburgh Academy of Medicine Bldg. Time: Fourth Monday of each month, except June, July, August and September.

PITTSBURGH SLIT-LAMP SOCIETY

President: Dr. W. W. Blair, 121 University Pl., Pittsburgh.
Secretary: Dr. George H. Shuman, Park Bldg., Pittsburgh.
Place: 121 University Pl. Time: Second Monday evening of every month, except June, July, August and September.

RICHMOND OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY

President: Dr. Samuel M. Cottrell, 116 E. Franklin St., Richmond, Va.
Secretary: Dr. Richard W. Vaughan, Medical Arts Bldg., Richmond, Va.
Place: Westmoreland Club. Time: 6 p. m., second Monday of each month from October to May.

Rochester Eye, Ear, Nose and Throat Society

President: Dr. Frank Barber, 75 S. Fitzhugh St., Rochester, N. Y.
Secretary-Treasurer: Dr. Laurence Macey, 221 Alexander St., Rochester, N. Y.
Place: Rochester Medical Association, 113 Prince St. Time: 8 p. m., third Monday of each month from October to May.

St. Louis Ophthalmic Society

President: Dr. Meyer Wiener, 308 N. 6th St., St. Louis.
Secretary: Dr. W. M. James, Metropolitan Bldg., St. Louis.
Place: Oscar Johnson Institute. Time: Clinical meeting 5:30 p. m., dinner and scientific meeting 6:30 p. m., fourth Friday of each month from October to April, inclusive, except December.

San Antonio Ophthalmolo-Oto-Laryngological Society

President: Dr. William D. Gill, 323 Medical Arts Bldg., San Antonio, Texas.
Secretary-Treasurer: Dr. Frank Steed, Nix Professional Bldg., San Antonio, Texas.
Place: Bexar County Medical Library. Time: 8 p. m., first Tuesday of each month from October to May.

San Francisco County Medical Society, Section on Eye, Ear, Nose and Throat

Chairman: Dr. Frank H. Rodin, 490 Post St., San Francisco.
Secretary: Dr. Louis F. Morrison, 490 Post St., San Francisco.
Place: Society's Building, 2180 Washington St., San Francisco.
Time: Fourth Tuesday of every month except May, June, July and December.

Shreveport Eye, Ear, Nose and Throat Society

President: Dr. John T. Crebbin, 624 Travis St., Shreveport, La.
Secretary-Treasurer: Dr. J. A. Wilkinson, Medical Arts Bldg., Shreveport, La.
Place: 1240 Texas Ave. Time: 7:30 p. m., first Monday of every month except July, August and September.

Spokane Academy of Ophthalmology and Oto-Laryngology

President: Dr. Marc Anthony, 422 Riverside Ave., Spokane, Wash.
Secretary: Dr. Raymond A. Lower, 1455 Paulsen Medical and Dental Bldg., Spokane, Wash.
Place: Paulsen Medical and Dental Library. Time: 8 p. m., fourth Tuesday of each month except June, July and August.

Syracuse Eye, Ear, Nose and Throat Society

President: Dr. Arnold B. Kauffman, 104 W. Onondaga St., Syracuse, N. Y.
Secretary-Treasurer: Dr. W. J. Werfelman Jr., 725 State Tower Bldg., Syracuse, N. Y.
Place: University Club. Time: Second Friday of each month except June, July and August.

Toronto Academy of Medicine, Section of Ophthalmology

Chairman: Dr. Samuel Mortimer Lyon, 122 Bloor St. W., Toronto.
Secretary: Dr. A. Lloyd Morgan, 86 Bloor St., West, Toronto.
Time: First Monday, November to April.

Washington, D. C., Ophthalmological Society

President: Dr. William Thornwall Davis, 927 Farragut Sq., Washington, D. C.
Secretary-Treasurer: Dr. James N. Greear Jr., 1740 M St., N. W., Washington, D. C.
Place: Episcopal Eye and Ear Hospital. Time: 8 p. m., first Thursday in November, January, March and May.